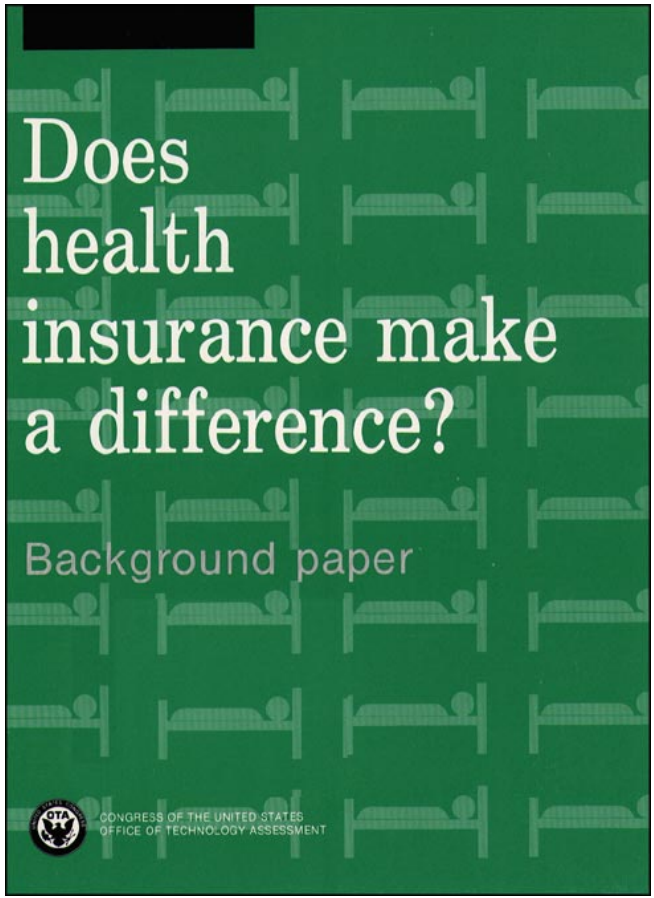
Does Health Insurance Make a Difference?

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Foreword

Reform of the Nation's health care system has risen to the top of the Nation's domestic policy agenda. Most health care reform efforts aim to simultaneously reduce health care costs, increase access, and maintain or improve the quality of care. But that is easier said than done; these multiple goals present a dilemma for policymakers, providers, and patients.

At the same time that concern for uninsured individuals intensifies, the Nation continues to observe double-digit increases in national health care expenditures. Many question whether increased expenditures have been accompanied by analogous improvements in health status; they suspect that much of the Nation's health dollars are wasted on unnecessary or inappropriate care that results in little positive (or even adverse) effects on health. These questions about the prevalence of unnecessary or inappropriate care have raised concerns about the extent to which increasing the number of Americans with health care coverage would actually improve their health. Individual examples of how high costs relative to family income impede access to care, how lack of access can cause greater treatment costs and premature deaths, and how personal health care expenditures have led to financial ruin have become a common focus of discussion. What can one conclude?

This Background Paper provides interim results of OTA's assessment *Technology, Insurance, and the Health Care System.* **It reviews the scientific literature linking health insurance status with access to and the use of health services, and with individual health outcomes. The assessment as a whole was requested by Senator Edward M. Kennedy, Chairman of the Senate Committee on Labor and Human Resources, and endorsed by Congressman John Dingell, Chairman of the House Committee on Energy and Commerce; Congressman Bill Gradison of the House Committee on Ways and Means Subcommittee on Health; and Senator Charles Grassley, a member of the Technology Assessment Board. This Background Paper was prepared in response to a specific request from Senator Kennedy.**

The development of this Background Paper was greatly assisted by a literature review prepared under contract to OTA by Joel Weissman and Arnold Epstein of Harvard University, and by an advisory panel, chaired by James L. Hunt, Chancellor, University of Tennessee-Memphis, Health Sciences Center, and a member of OTA's Technology Assessment Advisory Council. In addition, many other individuals provided information and reviewed drafts of the paper. OTA gratefully acknowledges the contribution of each of these individuals. As with all OTA documents, the final responsibility for the content of the assessment rests with OTA.



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NOTE: OTA appreciates and is grateful for the valuable assistance and thoughtful critiques provided by the workshop participants. The workshop participants do not, however, necessarily approve, disapprove, or endorse this background paper. OTA assumes full responsibility for the report and the accuracy of its contents.

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Introduction and Key Findings

INTRODUCTION

Health insurance coverage has been deemed to be an essential element of gaining access to health services. And the receipt of health services is often critical to maintaining and improving health. Yet, in 1990, an estimated 34.4 million individuals, or 15.7 percent of the U.S. population under age 65, were uninsured either all or part of the year (157,159). In addition, an unknown number of Americans were "underinsured' without adequate health insurance coverage. The large number of individuals without insurance raises two concerns: whether lack of coverage is associated with inequitable use of services; and, if so, whether such inequities result in differences in health outcomes.

This background paper reviews and evaluates the available literature linking health insurance coverage with the utilization and process of health care services and with individual health outcomes. The review was requested by the Senate Committee on Labor and Human Resources, and is part of a broader study on health insurance requested by that committee and endorsed by the Ranking Minority Member of the House Committee on Ways and Means Subcommittee on Health and by the House Committee on Energy and Commerce.[1]

In this background paper, the term *health insurance* is used broadly, to include both private health insurance coverage and public coverage (including Medicaid, the State/Federal health care financing program for low-income persons).[2] Private health insurance coverage is distinguished from public coverage whenever the data allow. *Utilization* of care is measured by counting particular health service events (e.g., a hospital stay or visit to a physician or other health care provider). *The process* of health care refers to the content and quality[3] of an episode of health care-in other words, what actually happens—when services are received. Examples include the number and types of medical procedures employed, and patient satisfaction. *Health outcomes are* defined here in terms of health status (e.g., perceived health status, stage of sickness, death).

This background paper focuses on the mainstream medical care system (e.g., care provided by physicians for the diagnosis and treatment of overtly somatic [physical] illnesses). It does not examine access to services typically provided outside the mainstream medical care system (e.g., mental health or substance abuse problems, dental or oral health care, nutrition counseling). This background paper makes no attempt to explicitly address the potential effects of insurance-related variations in utilization, process, or outcomes of care on overall national health expenditures.

The chain of events linking insurance coverage to the receipt of health care and to patients' health outcomes is long, complex, and often indirect. Many

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1 The Senate Committee onLaborandHuman Resources (Edward M. Kennedy, Chair) asked OTA to examine the issues surrounding the relationships between lack of various health insurancecoverages and 1) access to care, both preventive and therapeutic, 2) the type,location, and timing of services provided, and 3) effects on health status. The initial step in this examination was to be an interim report reviewing the scientific literature on these relationships; this background paper represents that interim report. In addition to providing their endorsement for the overall assessment, the House Committee on Ways and Means Subcommittee on Health (Bill Gradison, Rankfng Minority Member) asked OTA to examine other factors that might explain differences between the health status of those with and without insurance. The House Committee on Energy and Commerce (John Dingell, Chair) asked OTA to examine the relative cost effectiveness of certain forms ofhealth insurance in order to help address thedifficult policy question of how to fashion a minimum benefit package for the uninsured from the perspective of the cost effectiveness of coverage for certain procedures or illnesses or from the perspective of the cost effectiveness of general categories of benefits. Senator Grassley, a member of the Technology Assessment Board, also endorsed the request and asked for an examination of the medical tests used by insurance companies to screen individual applicants. Issues not addressed in this background paper will be examined in other reports associated with this assessment.

2 This background paper focuses on individuals without insurance and on the population underage 65, and so does not examine the impact of various levels of Medicare coverage. Most individuals in the United States aged 65 and over are covered by Medicare, the Federal program for the aged and certain disabled persons. In 1990, almost all individuals age 65 and older (29.8 million individuals [138], of an estimated 30.1 million individuals in the United States [157]) were covered for most hospital care under Part A of Medicare, the hospital insurance program. Only slightly fewer (29.4 million individuals) were covered by Part B, the supplementary medical insurance program that covers physician,outpatient, and other medical and health services (138). In addition, approximately 10 percent (9.9 percent; 3,380,000 individuals in 1991) of the population covered by Medicare is younger than 65 and covered because they are disabled (138). (See appendix D in this background paper for an overview of sources of health care coverage in the United States.)

3 OTA defines quality of health care as the "evaluation of the performance of health care providers according to the degree to which the process of care increases the probability of outcomes desired by the patients and reduces the probability of undesired outcomes, given the state of medical knowledge" (148).

factors other than insurance status have important effects on patterns of care and on health (figure 1). Even if insurance does lead to greater use of health services, the impact of the services on health status may be minimal relative to other factors. For example, many have raised questions about the appropriateness of, or need for, a substantial portion of the health care delivered in the United States (e.g.,19,43,117), [4] On the other hand, timely and effective health services can save, and improve the quality of, lives. Almost none of the available research on access and effectiveness analyzes the entire linkage from insurance coverage to utilization to health outcomes. Thus, this literature review had to rely upon building several bridges among available literatures. These literatures focus on relationships:

- between health insurance coverage and utilization of care;
- between health insurance coverage and the process of care when it is received; and
- between health insurance coverage and health outcomes.

The literature review in this background paper is limited to studies published since 1980 that addressed the topics of possible relationships between insurance coverage (or lack of it) and the use, process, or health outcomes of care. The focus is on studies that made some attempt to adjust methodologically for at least some potential alternative explanations for findings (e.g., patient's preexisting health status, income level, site of care). The literature synthesis focused frost on whether studies found a relationship between insurance coverage and access to health care or between insurance coverage and health outcomes; then a subset of studies with the most recent data was used to examine the magnitude of the relationships.

KEY FINDINGS

Does health insurance make a difference? Research conducted in the last decade supports the common-sense notion that having or lacking health insurance coverage is related to gaining access to services, to the types, quality and intensity of the care that is delivered, and, logically, to patient health. Although the findings are not completely consistent, the research suggests the following:

- *Uninsured Americans* may be up to 3 times more likely than *privately insured individuals* to experience a lower health care utilization rate, potentially inadequate health care, and adverse health outcomes (figure 2).
- Publicly funded programs such as Medicaid have been developed to improve access to care for those individuals who do not have private coverage, and the available evidence suggests that *individuals with public coverage* may be slightly better off than those who are *uninsured.*[5] When the health experiences of uninsured individuals have been compared with those of publicly covered individuals, uninsured Americans have been found to be up to 1.3 times more likely than publicly insured individuals to experience a lower health care utilization rate, and 1.5 times more likely to experience potentially inadequate health care (figure 3).
- Publicly covered patients may be worse off than privately insured patients. *Publicly covered patients are* up to 2.5 times more likely than *privately insured patients to* experience potentially inadequate health services, and up to 4 times more likely to experience an adverse health outcome (figure 4).

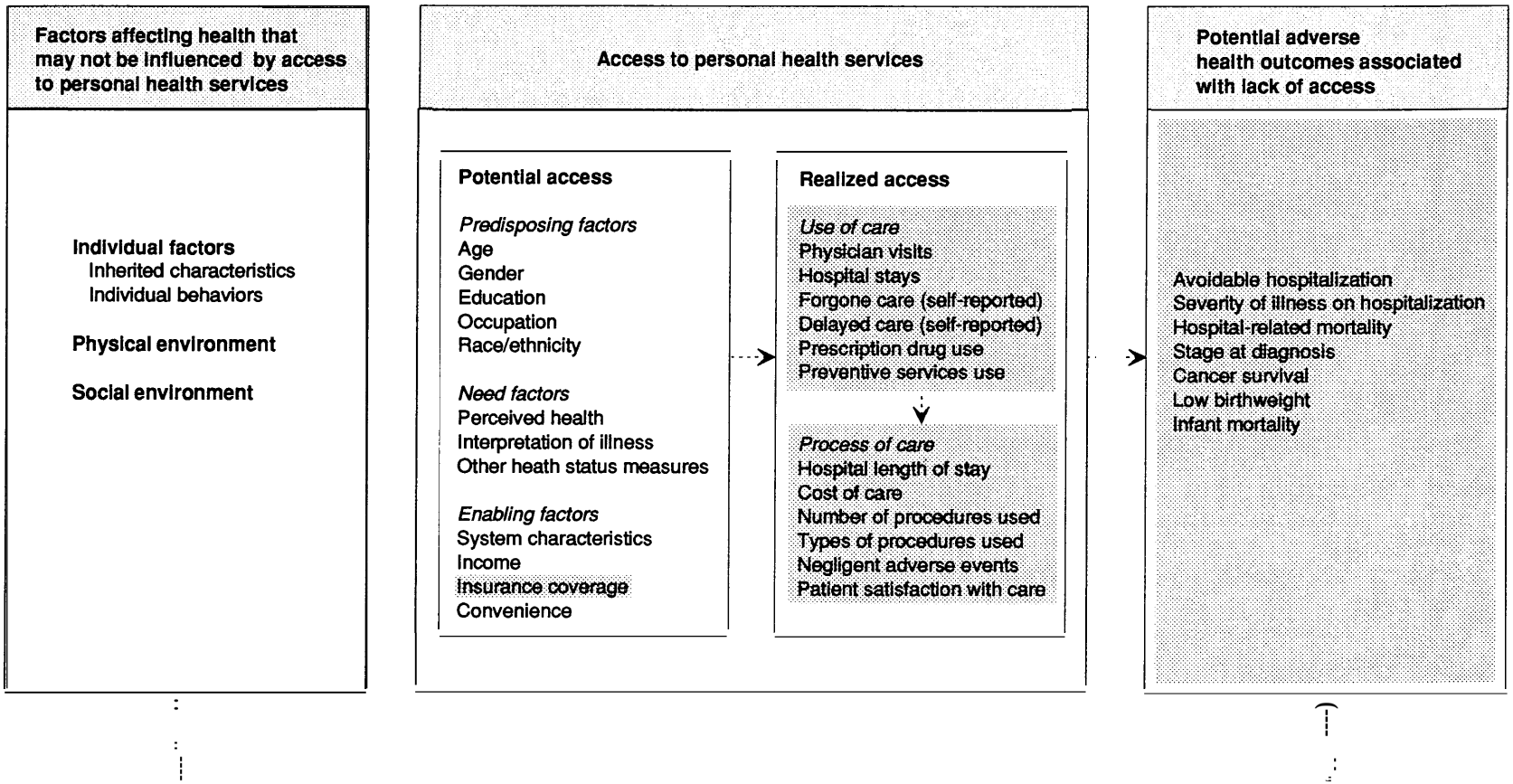
Specific studies reviewed by OTA fmd that:

- Lack of insurance coverage may prevent individuals from seeking care. Studies show that uninsured individuals are less likely than privately insured individuals to have a usual source of care (64,73,118), use preventive services (124,189), visit a physician (99), and be hospitalized (31,99). Uninsured individuals are more likely to report that they have not received needed care (3,64).
- Consistent with individuals' self-reports about delaying the receipt of needed care, uninsured patients have been found to be up to 4 times as likely as insured patients to require both avoidable hospitalizations and emergency hospital care (e.g., 61,179). Some evidence suggests that uninsured patients may be up to twice

[4] This issue is addressed in appendix C, and will be addressed more fully in the final report from this assessment.

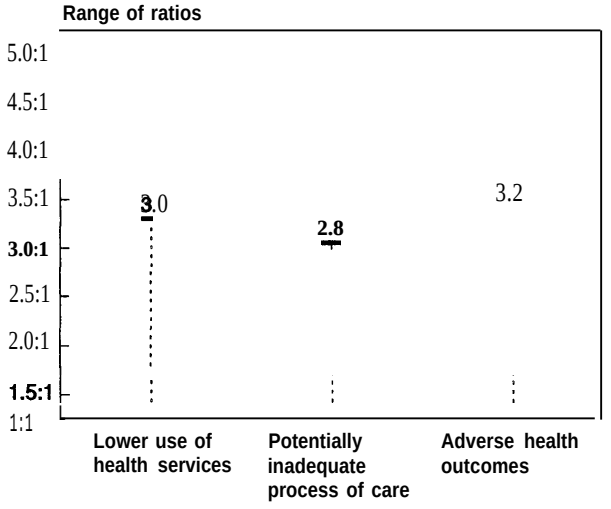
[5] OTA uses phrases such as 'may be. . better off' and "potentially worse off' for two reasons: 1) the study findings must be regarded as somewhat tentative; and 2) in some cases it is not clear whether the endpoint measure is in fact a "better" or "worse' outcome for the more poorly insured (e.g., greater use of certain procedures).

Figure 1—Basic Framework for Effects of Health Insurance on Use of Care, Process of Care, and Patient Health



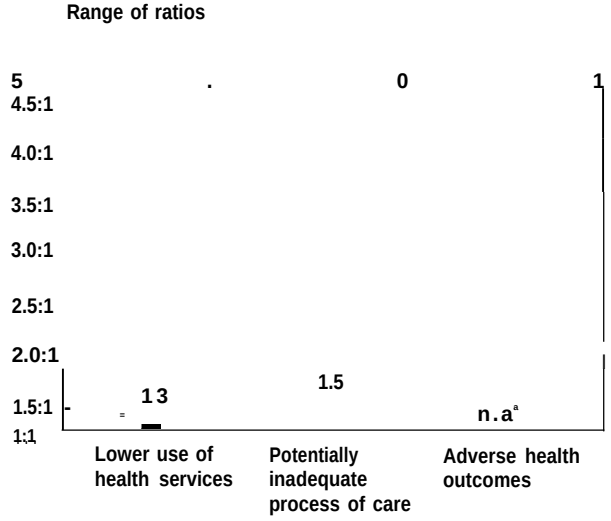
SOURCE: Office of Technology Assessment, 1992.

Figure 2—Observed Variation in Research Findings in the Magnitude of Relationships Between Health Insurance Coverage, Use of Health Services, Process of Care, and Health Outcomes: Ratios of Uninsured to Privately Insured Patients



SOURCE: Office of Technology Assessment, 1992, based on studies included in this Background Paper.

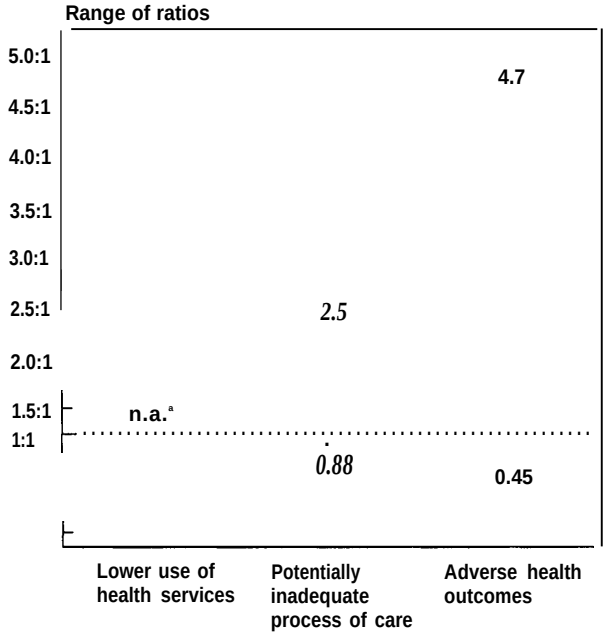
Figure 3-Observed Variation in Research Findings on the Magnitude of Relationships Between Health Insurance Coverage, Use of Health Services, Process of Care, and Health Outcomes: Ratios of Uninsured to Publicly Covered Patients



[a]No studies meeting criteria for inclusion in this review examined differences in health outcomes between uninsured and publicly covered patients.

SOURCE: Office of Technology Assessment, 1992, based on studies included in this Background Paper.

Figure 4-Observed Variation in Research Findings on the Magnitude of Relationships Between Health Insurance Coverage, Use of Health Services, Process of Care, and Health Outcomes: Ratios of Publicly Covered to Privately Insured Patients



[a]No studies meeting criteria for inclusion in this review examined differences in utilization between publicly covered and privately insured patients.

SOURCE: Office of Technology Assessment, 1992, based on studies included in this Background Paper.

as likely to be at risk of dying when they reach the hospital door (17,61).

- Even if the seeking or receipt of care is not delayed, uninsured patients who are hospitalized have been found to be half as likely as insured patients to receive certain high-cost (but not necessarily more appropriate and effective) procedures (61,129,177,183).

IMPORTANT CAVEATS AND OVERALL CONCLUSIONS

Despite the preponderance of findings showing an association among health insurance, access to care, and health status, some analyses have found no evidence of an independent relationship between insurance coverage and specific aspects of access and health (e.g., 27,60,1 19,177). Other analyses find that relationships among insurance coverage, access, and health vary by illness and medical procedure (179,183,189), by age, sex, or racial grouping (61),

or by hospital *(46)*. There is still considerable question about the nature of the measures used to gauge use, process, and outcomes of health care. Thus, the vertical lines in figures 2, 3, and 4 are shown as dashes to indicate that there is considerable variability in study results.[6] A range of results is not what would be expected if: insurance coverage was the sole determinant of health care delivery (and health); if public programs typically provided poorer financial coverage (or health care) than private coverage; if uninsured, privately insured, and publicly covered populations were homogeneous[7]; and if measures were perfect. "Noncoverage" factors undoubtedly play some part in access to care and in patient health (e.g., 120,152,153,154,155).

Researchers typically acknowledge that alternative explanations for observed findings cannot be ruled out, and they continue to caution that results of existing studies cannot be viewed as definitive, given existing research approaches (e.g., 61,107,179). Use of prospective designs and better controls could make future studies more informative. Such studies may become more feasible as the health insurance environment continues to change. Given the variation and limitations in methods and data, and the lack of a complete theoretical model to explain the relationships, however, the level of consistent results is impressive. For now, existing research supports common-sense notions and anecdotal evidence that availability of third party payment for health care can be important, in particular to gaining access to care and to the way care is delivered.

ORGANIZATION OF THE BACKGROUND PAPER

The next section of this background paper provides supporting details from the literature review and synthesis conducted by OTA and its contractors. A variety of appendices, prepared by OTA, provide background information. Appendix A lists outside experts who contributed to the development of this background paper. Appendix B is a glossary of terms and abbreviations. Appendix C provides a conceptual framework for viewing the interrelationships among insurance coverage, access to and utilization of health services, the process of care, and individual health outcomes, and discusses general methodological issues in research on insurance status, access, and outcomes. Appendix D provides background information on the characteristics of individuals with and without insurance and information about what insurance coverage provides. Appendix E lists important methodological details on the multivariate research studies examined in this review. Appendix F consists of a brief overview of findings from the RAND Health Insurance Experiment.

The contractor paper which served as the basis for the review of the empirical literature on relationships among insurance coverage, utilization, process, and health outcomes (178) is available from OTA.

6 As shown in figure 2, for example, study results ranged from no statistically significant differences between uninsured and privately insured individuals (shown as 1:1 ratios) to differences of about 3 times. In figure 4 the numbers below the line marked "1:1" indicate that publicly covered patients had longer hospital stays (46) and potentially better outcomes from outpatient care (179) than did privately insured patients. The ratios derived from specific study results are depicted in the section "Detailed Findings" below.

7 Individual patients who are grouped (in studies and in real life) as being "uninsured," "publicly insured," or "privately insured" constitute a highly diverse set of individuals in terms of income, race, family living arrangements, health status, and other factors. See appendix E in this background paper, "Health Insurance in the United States: Who Is Covered, Who Is Not Covered, and What Coverage Provides."

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 fmdings.[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 insurance 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 R*) 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.

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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 believedwedto 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 determiningg 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 cam. 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 hospital 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 abetter 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.**

ing 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	B	C	D
	Uninsured vs. privately insured patients	Uninsured vs. publicly covered patients	Uninsured vs. publicly and privately insured patients combined	Publicly covered vs. Privately insured patients
Lacking a regular or usual source of care				
Rosenbach, 1985	+[a]	+	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.	+

[a] Key: + = 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.

[b] Key: + = 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.

[c] Key: + = less advantaged (first listed) groups more likely than more advantaged (second listed) groups to have less inPatient hospital care; M = mixed results; O = no statistically significant differences were found; n.a. = comparison was not made in study.

[d] Key: + = less advantaged (first listed) groups likely to have had fewer preventive health care visits than more advantaged (second listed) groups; 0 = 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:

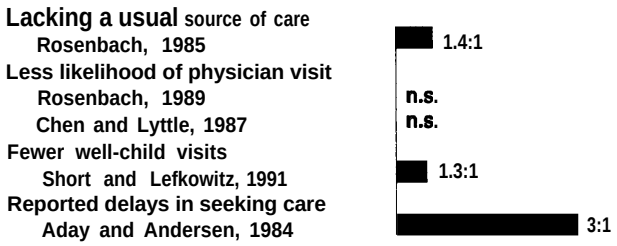
- **lack a usual source of care (65,73,118);**
- **have fewer episodes of inpatient hospital care (27,30,99);**
- **lack preventive services (124,189); and**
- **report delays in receiving health care (4,65,99).**

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 "O" 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 revered by private insurance all year. These differences in contact between privately insured and uninsured children occured 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.

1325.2 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

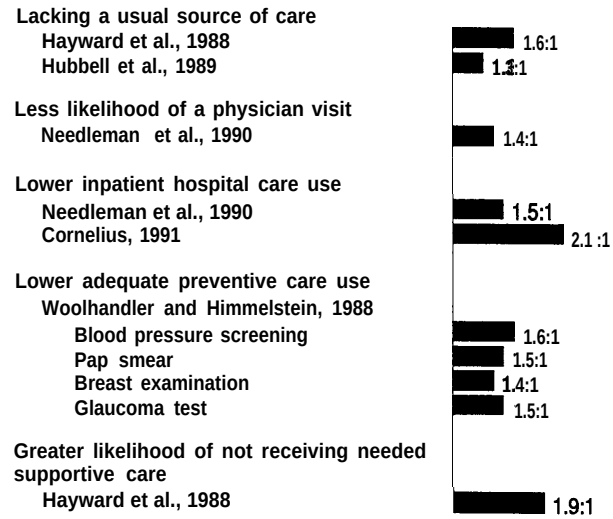


- In Short and Lefkowitz's study, 48.5 percent of pre-school children who were uninsured all year had had any well-child visits, compared with 56.4 percent of pre-school children who had Medicaid coverage all year. Short and Lefkowitz estimated that a full year of Medicaid would increase the probability 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.

[a]Woolhandler 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).

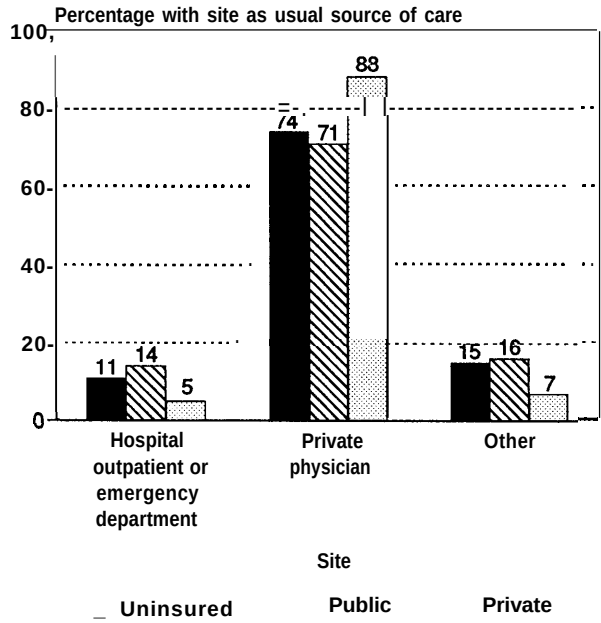
These figures on the site of the usual source of care may underestimate the reliance of uninsured persons on hospital-based ambulatory care because they are based only on individuals who claim to have a consistent source of care. In a study of children, the proportion of care received in the emergency 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 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.

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*, AHCPR 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).

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 Measares Used as Potential Indicaiors of Insurance-Related Problems in Access

A nunber of process of care measures have been examined as indicators of potential insuranm-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 we, 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 fur 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 adminstration 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 imp@ 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.Intable2,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 Potentiailly 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[b]
Dowd et al., 1986	+	M	
Duncan and Kilpratick, 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
Weissman and Epstein, 1989	+	0	0e
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	+1	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

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

[b] A test of statistical significance was not conducted for differences between Medicaid-covered and privately insured patients.

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

[d] K$_{ey}$: + = 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.

[e] A$_n$ exception was that significant differences between patients covered by Medicaid-covered and privately insured patients were found by hospital type.

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

[g] Statistically significant for two of three procedures.

[h] Statistically significant for one of three procedures (angioplasty).

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

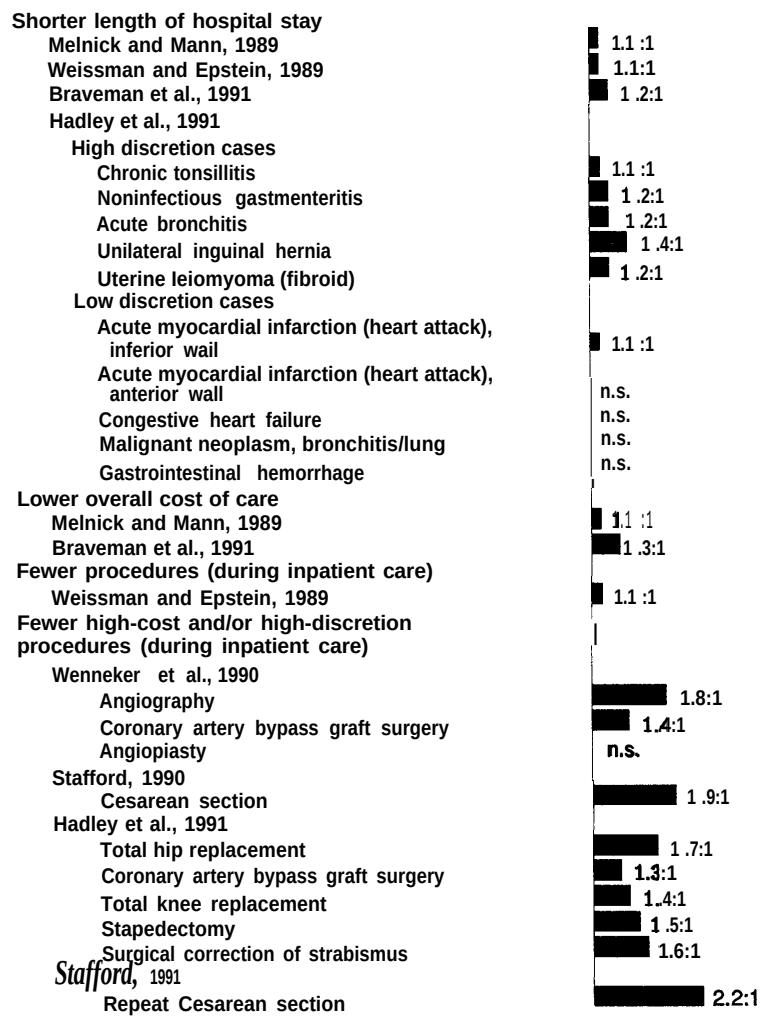
[j] Key: + = less advantaged (first listed) groups got fewer potentially life-saving procedures than did more advantaged (second listed) groups; n.a. = comparison was not made in study.

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

[l] Key: + = 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; O = 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 angiogmphies[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 [fybroid]), 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 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 alli satisfied."

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

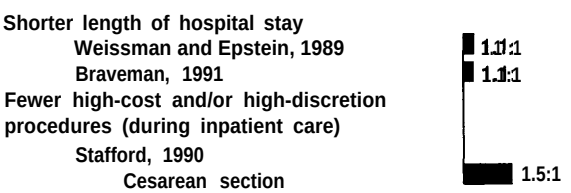
As expected, *uninsured* patients have been found to have shorter stays than patients covered by *Medicaid* (11,18,82,95,177) (table 2). Also as might be expected, the magnitude of the differences is somewhat smaller than the differences between uninsured and privately insured patients (figure 11).

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 l—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.[a]

[a]The 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 (27,103,1 14) (table 2) sometimes by large margins (figure 10).**

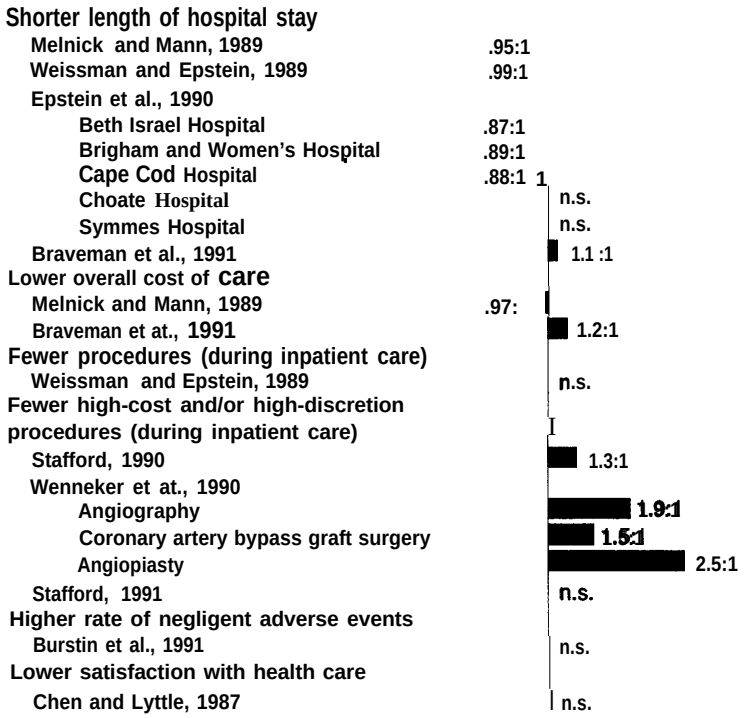
Neither Chen and Lyttle nor Oberg and his colleagues found differences in satisfaction between *publicly and privately insured* **patients (27,103).**

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**

[17] Depending on tie payment arrangements, delivering equivalent services in a shorterperiod 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
[a] As 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-payer 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 maybe difficult to generalize across States.
[b] This finding can be contrasted to the results shown earfierinfigure 9, in which uninsured (self-pay) patients had shorter stays (by9.1 percent) than privately insured patients.
[c] In 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.
[d] The 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 measurewhether 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 hospitization 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 potentialrelaticmhip 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 commbidities (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 adversely 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, uninsured[18] 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*

18 In 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	+[a]	+	+[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]	0[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)	0[o]	0[P]	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

[a]Key: + = 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.
[b]Findings apply to Medicaid vs. "all other insured" patients.
[c]Key: + = 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.
[d]Key: + = 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.
[e]Measure used was weekend admissions.
[f]Uninsured patients were from 11 t. 27 percent more likely than privately insured patients to be admitted on weekends in 14 of 16 age-sex-race strata.
[g]Uninsured 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.
[h]The case-mix severity index in this study was based on expected length of stay.
[i]Key: 0 = no statistically significant difference between groups.
[j]Key: + = 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.
[k]Hadley found higher mortality for uninsured patients in 10 of 16 age-sex-race cohorts.
[l]Key: + = 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.
[m]Study 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.
[n]Key: 0 = no statistically significant difference between groups. The categories "other" and "no" insurance Were combined
[o]Key: 0 = no statistically significant difference in birthweight or prematurity between groups.
[p]This 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.
[q]Study compared patients covered by Medi-Cal with patients not covered by Medi-Cal. Medi-Cal is the name of California's Medicaid program.
[r]Key: 0 = no statistically significant difference between groups in the rate of low birthweight babies; n.a. - comparison not made.
[s]Howell and his colleagues found that infants born to mothers who were enrolled in Medicaid for 4or 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.
[t]Comparison 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 Angles 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.

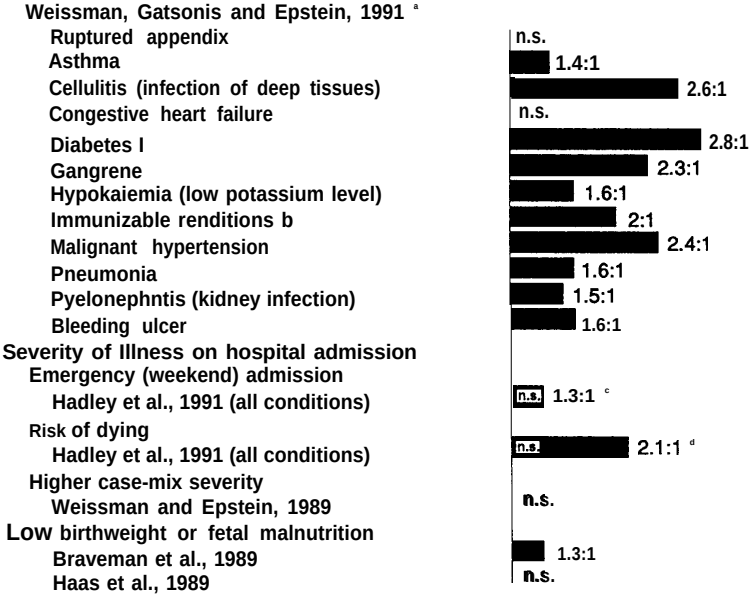
Variations in Magnitude

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

[19] Precisely 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



■ 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]

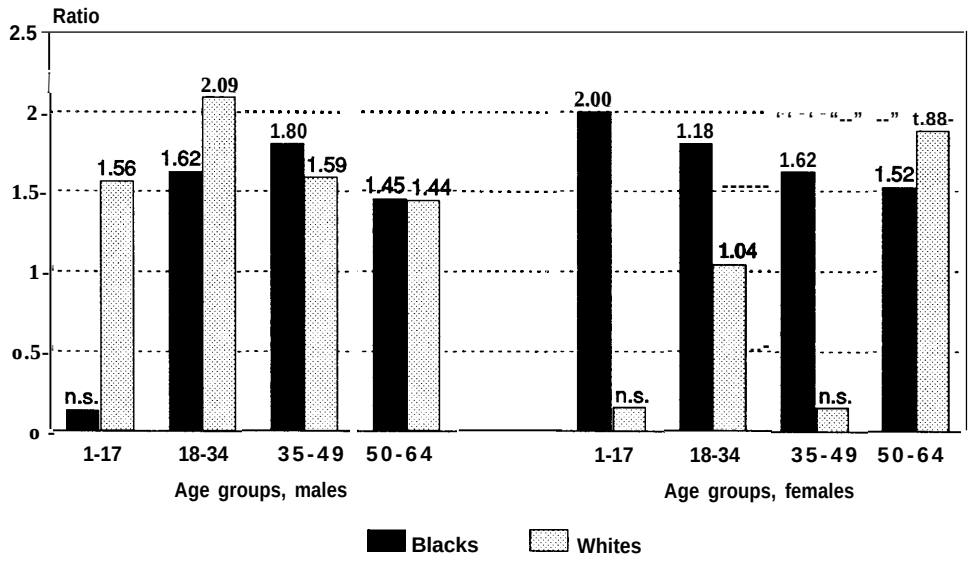
n.s. = not statistically significant.
[a]Data from the Massachusetts arm of the study are shown. Similar, though slightly less dramatic, findings were found in Maryland hospitals.
[b]The immunizable conditions included whooping cough, diphtheria, tetanus, mumps, acute polio, and measles.
[c]Findings were not significant in 2 of 16 age-sex-race strata; 1.3 represents the high end of the Significant results.
[d]Findings were not significant in 3 of 16 age-sex-race strata; 2.1 represents the high end of the significant results.
[e]For 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).**

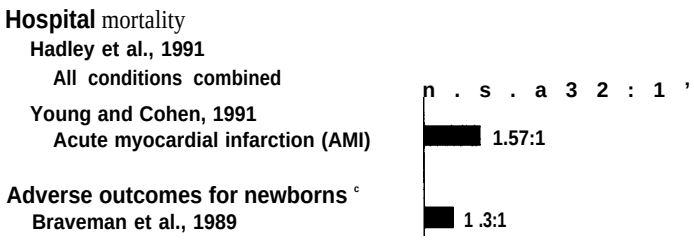
Hadley and his colleagues' note that they are dealing with averages is important; exceptions do occur (e.g., some privately insured people may want to be hospitalized on a Sunday night rather than a Monday morning so that tests can be done in the hospital rather than on an outpatient basis). In the current 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 fmd 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 inhospital 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



- in Young and Cohen's study, 10.7 percent of hospitalized uninsured heart attack (AMI) patients died in the hospital, compared with 6.5 percent of insured fee-for-service patients, and 7.1 percent of HMO patients.
- in the study by Braveman and colleagues, 8.5 percent of uninsured newborns had an adverse outcome (prolonged stay, transfer to another hospital, or death), compared with 6.1 percent of privately insured newborns.

n.s. = not statistically significant.
HMO = health maintenance organization.
[a]Not significant in 6 of 16 age-sex-race groups.
[b]3.2 represents the high end of the significant results; 1.2 represents the low end of the significant results.
[c]The 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.

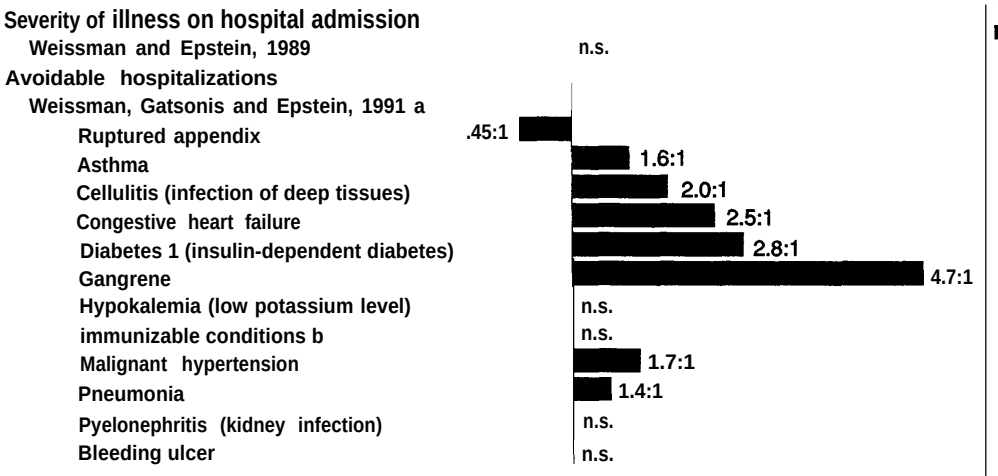
ing from ratios of 0.45:1 to 4.70:1) (figure 16). Generally, however, these comparisons support the hypothesis that publicly covered patients' health may suffer as a result of inaccessible or relatively poorly delivered care. It is important to note, however, that Medicaid-covered patients may receive 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



■ 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 conditions. While Weissman and Epstein's study found that the distribution of leading causes of hospitalization by condition or procedure varied by payer group? overall case-mix severity indexes were similar for different payers (1.00 for Blue Cross-covered patients and 1.01 for Medicaid-covered patients).

n.s. = not statistically significant.
[a]Data from the Maryland arm of the study are shown.
[b]The immunizable conditions included whooping cough, diphtheria, tetanus, mumps, acute polio, and measles.
[c]DRGs 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 intervals[22] 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 families. 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.

Appendix A
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Appendix B

Glossary of Acronyms and Terms

Acronyms

AFDC —Aid to Families with Dependent Children
AHCPR —Agency for Health Care Policy and Research (PHS)
BLS —Bureau of Labor Statistics (USDOL)
CABG -coronary artery bypass graft
CBO -Congressional Budget Office (U.S. Congress)
CDC -Centers for Disease Control (PHS)
CHAMPUS -Civilian Health and Medical program of the Uniformed Services (Department of Defense)
CPS -Current Population Survey (U.S. Bureau of the Census)
CRS -Congressional Research Service (U.S. Congress)
EBRI —Employee Benefits Research Institute
ECA —Epidemiologic Catchment Area program (National Institute of Mental Health)
EPSDT —Early and Periodic Screening, Diagnosis, and Treatment program (Medicaid)
GAO General Accounting Office (U.S. Congress)
HCFA —Health Care Financing Administration (USDHHS)
HIE —Health Insurance Experiment (RAND Corporation)
HMO -health maintenance organization
IOM —Institute of Medicine (National Academy of Sciences)
MEDTEP —Medical Treatment Effectiveness program (AHCPR)
NAMCS —National Ambulatory Medical Care Survey
NCHS —National Center for Health Statistics (CDC)
NHIS —National Health Interview Survey (NCHS)
NMCES —National Medical Care Expenditure Survey (USDHHS)
NMCUES —National Medical Care Utilization and Expenditure Survey (USDHHS)
NMES —National Medical Expenditure Survey (USDHHS)
MSA —metropolitan statistical area
OBRA-89 -omnibus Budget Reconciliation Act of 1989 (Public Law 101-239)
OBRA-90 -Omnibus Budget Reconciliation Act of 1990 (Public Law 101-508)
OHTA -Office of Health Technology Assessment (AHCPR)
OTA -Office of Technology Assessment (U.S. Congress)
PHS —U.S. Public Health Service (USDHHS)
PORT —Patient Outcomes Research Teams (AHCPR)
PPO —preferred provider organization
PTCA —percutaneous transluminal coronary angioplasty
RWJF —Robert Wood Johnson Foundation
SSI -Supplementary Security Income
USDHHS —U.S. Department of Health and Human Services
USDOL —U.S. Department of Labor

Terms

Access to health care: Potential and actual entry of a population into the health care delivery system. Elements of access include availability, affordability, and approachability.

Acute condition: Generally an injury, an *illness,* or an *impairment* of limited duration. For purposes of the *National Health Interview Survey* conducted by the U.S. Department of Health and Human Services, an acute condition is a physical or mental condition that has lasted less than 3 months; is not a condition that normally lasts more than 3 months (e.g., *diabetes,* arthritis); and is of sufficient consequence to have involved either at least one doctor visitor at least 1 day of restricted activity. Compare *chronic condition.*

Adverse events: Untoward events involving patients. Adverse events are typically unanticipated poor patient outcomes, such as death or readmission to the hospital. Other incidents such as improper administration of medications or patient falls are also considered adverse events, even if there is no effect on the patient.

Agency for Health Care Policy and Research (AHCPR): A Federal agency created in 1989 by an act of Congress to serve as the Federal Government's focal point for medical effectiveness and health services research. The purpose of AHCPR is to enhance the quality, appropriateness, and effectiveness of health care services and to improve access to that care. Programs within AHCPR include the Medical Treatment Effectiveness program (MEDTEP), which seeks to understand the effects of variations in health care practices on patient outcomes and develops and disseminates scientific information in an attempt to improve patient care; the Office of the Forum for Quality and Effectiveness in Health Care, which facilitates development of *clinical practice guidelines* for specific *conditions* and *treatment services;* the Office of Science and Data Development, which develops data-

bases to support research on patient outcomes; the Center for Research Dissemination and Liaison, which is charged with disseminating information to encourage adoption of MEDTEP findings and clinical guidelines; the Office of Health Technology Assessment (OHTA), which evaluates medical technologies, procedures, and services for the Public Health Service (primarily at the request of USDHHS' *Health Care Financing Administration)* and recommends whether they should be covered; and other intramural and extramural research programs. AHCPR is located in the Public Health Service in the U.S. Department of Health and Human Services.

Aid to Families With Dependent Children (AFDC): A federally supported, State-administered program established by the Social Security Act of 1935 that provides financial support for children under the age of 18 who have been deprived of parental support or care because of the parent's death, continued absence from the home, unemployment, or physical or mental illness.

Ambulatory care: Health care services provided to patients who are not inpatients of hospitals or other residential facilities (e.g., residential treatment centers, nursing homes). May include care provided to hospital outpatients. See also office *visit and physician contact.*

Angiography: 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. Also known as heart catheterization, coronary angiography, and coronary arteriography.

Angioplasty: See *percutaneous transluminal coronary angioplasty.*

Balloon catheter angioplasty: See *percutaneous transluminal coronary angioplasty.*

Beneficiary: A person who is eligible for or receiving benefits under an insurance policy or plan. The term is commonly applied to individuals receiving benefits under the ***Medicaid*** or Medicare programs or covered under *a private health insurance plan.*

Benefit: A sum of money provided in an insurance policy payable for certain types of loss, or for covered services, under the terms of the policy. The benefits may be paid to the insured or on the insured's behalf to others.

Blue Cross plan: A nonprofit, tax-exempt membership corporation which provides coverage for hospital care and related services in a limited geographical area. Individual Blue Cross plans should be distinguished from their national association, the Blue Cross Association. A Blue Cross plan must be an independent, nonprofit membership corporation with a governing body whose membership includes a majority of public representatives.

Blue Shield plan: A nonprofit, tax-exempt membership corporation which provides health insurance coverage for physicians' services in a limited geographical area. Blue Shield coverage is sometimes sold in conjunction with *Blue Cross* coverage, although this is not always the case.

Cavitation payment: A method of payment for health services in which an individual or institution provider is paid a fried amount for each person served in a set period of time, usually a year, without regard to the actual number or nature of services provided to each person. This is the characteristic payment method in *health maintenance organizations (HMOs).* Compare *fee-for-service.*

Case finding: The identification of instances of a particular disease or condition through screening of asymptomatic people or surveillance of defined populations.

Case management: A term used in this background paper to mean monitoring and coordination of treatment rendered to patients with specific diagnoses or requiring high-cost or extensive services.

Case mix: A measure of the mix of cases being treated by a particular health care provider that is intended to reflect the patients' different needs for resources. Case mix is generally established by estimating the relative frequency of various types of patients seen by the provider in question during a given time period and may be measured by factors such as diagnosis, *severity of illness, utilization* of services, and provider characteristics.

Categorically needy: Individuals who are eligible for *Medicaid* benefits because: 1) they are members of a category of eligible persons receiving cash assistance under the Aid to Families With Dependent Children (AFDC) or Supplementary Security Income (SSI) programs; and 2) their income falls below specified levels. Compare *medically needy.*

Causality: Relating causes to the effects they produce. Most of epidemiology concerns causality, and several types of causes can be distinguished. A cause is termed "necessary" when a particular *variable* must always precede an effect. This effect need not be the sole result of the one variable. A cause is termed "sufficient" when a particular variable inevitably initiates or produces an effect. Any given cause maybe necessary, sufficient, neither, or both.

Cellulitis: An acute, spreading inflammation of deep sub-skin tissues, sometimes muscle tissues, and other connective tissues. It is caused by various bacteria from a wound, burn, or other opening in the skin.

Central cities: Central cities are defined in two different ways by the Bureau of the Census within the U.S. Department of Commerce. The largest city in each *metropolitan statistical area* (MSA) (also called *metropolitan area)* is designated as a central city. There

may be additional central cities if specified requirements, designed to identify places of central character within the MSA, are met. The balance of the MSA outside the central city or cities often is regarded as equivalent to "suburbs."

Cesarean section: A surgical operation through the walls of the abdomen and uterus for the purpose of giving birth.

Charge: The price of a service or amount billed to an individual and/or third party. Compare ***cost.***

Chronic condition: A problem or disease that is lingering and lasting, as opposed to acute. For purposes of USDHHS' ***National Health Interview Survey,*** a condition is considered "chronic" if: 1) the respondent indicates it was first noticed more than 3 months before the reference date of the interview and it exists at the time of the interview, or 2) it is the type of condition that ordinarily has a duration of more than 3 months. Examples of conditions that are considered chronic regardless of their time of onset are ***diabetes,*** heart conditions, emphysema, and arthritis.

Civilian Health and Medical Program of the Uniformed Services (CHAMPUS): A Department of Defense program supporting private sector health care for dependents of active and retired members of the uniformed services.

Clinical practice guidelines: Systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific clinical ***conditions.***

Coinsurance:. Coinsurance is a health insurance policy provision that requires the insured party and the insurer to share the covered losses in a specified ratio after the ***deductible*** has been met and before the maximum liability has been reached (e.g., 20 percent by the insured party and 80 percent by the insurer). Coinsurance is a type of ***cost sharing.***

Community rating: A method of determining health plan premiums by basing the premiums on the average costs of health services for all subscribers within a specific geographic area. Under community rating, the premium does not vary for different groups or subgroups of subscribers who have different specific claims experience. Compare ***experience rating.***

Comorbidities: Diseases or conditions present at the same time as the principal condition of the patient.

Comparison group: In research, a group that does not receive the "experimental" intervention or program, but receives no or a different intervention. See also ***experimental design.***

Condition: As defined for purposes of the ***National Health Interview Survey*** conducted by USDHHS, a departure from a state of physical or mental well-being. A health condition maybe an injury, an ***illness,*** **or an** ***impairment. See also acute condition, chronic condition.***

Congestive heart failure: A syndrome due to heart disease. It is characterized by breathlessness and swelling from the buildup of fluids because of abnormal sodium and water retention. Congestion may occur in the lungs and/or in the surrounding blood vessels.

Control group: In a randomized clinical trial or other ***experimental*** **or** ***quasi-experimental design,*** **the group receiving no treatment or some treatment with which the group receiving experimental treatment is compared. The control treatment is generally a standard treatment, a placebo, or no treatment. Compare** *experimental group.*

Copayment: A type of cost-sharing which is a fixed dollar amount that a health plan enrollee is required to pay for a covered service (e.g., $3 per prescription drug) and is applied toward the cost of each service received. A copayment is unlike *coinsurance,* **the** copayment amount typically does not vary according to the total ***cost*** or ***charge*** of the service. For example, a prescription drug plan might require a payment of $2, $3 or more for each prescription, regardless of the actual cost of the medication.

Coronary artery bypass graft (CABG): A type of heart surgery in which a leg vein or mammary (chest) artery is taken and sewn to a section of coronary artery below the point of blockage in order to supply the heart with blood. Placement of the graft is preceded by putting the patient on a heartlung machine and stopping the heart using an icy, cold, potassium-containing solution.

Cost sharing: A health insurance policy provision that requires the insured party to pay a portion of the costs of covered services. ***Deductible, coinsurance,*** **and** ***copayment are types*** of cost sharing.

Cost: Expenses incurred in the provision of services or goods. Many different kinds of costs are defined and used (e.g., allowable, direct, indirect, and operating costs). ***Charges*** **may or may not be the same as, or** based on, costs. Providers may charge more for a given service than it actually costs in order to recoup losses from providing other services where costs exceed feasible charges, or to make a profit or maintain an operating margin.

Cross-sectional (research design): Designs involving samples drawn to be representative of the entire population of interest, studied at a particular point in time.

Current Population Survey (CPS): A household sample survey of the United States civilian noninstitutionalized population that provides estimates of employment, unemployment, and other characteristics of the general labor force, the population as a whole, and various other subgroups of the population. The survey is conducted by the Bureau of the Census within the U.S. Department of Commerce. Annual data on health insurance coverage are obtained in the March supple-

ment to the Current Population Survey, which surveys a sample of households from the most recent decennial census.

Deductible: Under a health insurance policy, a dollar amount incurred by an insured individual for covered services-either a specific amount of money (e.g., $200) or the value of specified services (e.g., 2 days of hospital care or one physician visit)-that the insured individual must pay before an insurer will assume liability for all or part of the remaining covered services. Deductibles are usually tied to some reference period over which they must be incurred (e.g., $200 per calendar year, benefit period, or spell of illness). A deductible is a type of *cost sharing.*

Demand: In health economics, the amount of a good or service consumers are willing and able to buy at varying prices, given constant income and other factors. Demand should be distinguished from *utilization.*

Diabetes Type I: Insulin-dependent diabetes mellitus. A chronic metabolic disorder characterized by an inappropriate elevation of blood glucose level and impaired fat and protein metabolism, for which a lack or insufficiency of insulin production by the pancreas is responsible. If untreated (i.e. if the diabetic does not receive insulin from an outside source), complications progress from nausea, to a stupor, to a coma, and then to death.

Diagnosis-related groups (DRGs): Groupings of diagnostic categories drawn from the International Classification of Diseases and modified by the presence of a surgical procedure, patient age, presence or absence of significant comorbidities or complications, and other relevant criteria. See also ***case mix.***

Disability: Any limitation of physical, mental, or social activity of an individual as compared with other individuals of similar age, sex, and occupation. The term frequently refers to limitation of a person's usual or major activities, most commonly vocational. There are varying types (functional, vocational, learning), degrees (partial, total), and durations (temporary, permanent) of disability. Public programs (such as Social Security and Medicare) often provide benefits to persons afflicted with specific disabilities.

Disease: Any deviation from or interruption of the normal structure of function of any part, organ, or system (or combination thereof) of the body that is manifested by a characteristic set of symptoms and signs and whose etiology, pathology, and prognosis may be known or unknown. See *condition.*

Drug: Any chemical or biological substance that maybe applied to, ingested by, or injected into humans in order to prevent, treat, or diagnose disease or other medical conditions.

Early and Periodic Screening, Diagnosis, and Treatment (EPSDT) program: A State and federally **funded, State-administered program under Medicaid that is intended to provide preventive screening exams and followup services for illnesses, abnormalities, and treatable conditions to Medicaid-eligible children under age 21. The EPSDT benefit was enacted in 1967 and significantly expanded in 1989.**

Effectiveness: Effectiveness is a particular application of *efficacy,* that is, it reflects the performance **of an** intervention under ordinary conditions by the average practitioner for the typical patient.

Efficacy: Efficacy has been defined by the Office of Technology Assessment as the probability of benefit to individuals in a defined population from a medical technology applied to a given medical problem under ideal conditions of use. Compare *effectiveness.*

Employment-based group health plans: A group health plan that is offered to employees by an employer.

Experience rating: A method of determining health plan premiums based on the historical utilization data and distinguishing characteristics of a specific subscriber group. Compare *community rating.*

Experimental design: Strictly speaking, a research design in which research participants are randomly assigned to one or more *experimental groups* or one or more ***control or comparison groups.*** **Compare** *quasi-experimental design.*

Experimental group: In a randomized clinical trial, other experiment, or evaluation research, the group receiving the treatment being evaluated for safety or efficacy. The experiment treatment may be a new technology, an existing technology applied to a new problem, or an accepted treatment about whose safety or efficacy there is doubt. Compare *control group.*

Federal poverty level: The official U.S. Government definition of poverty **based on cash income levels for families of different sizes. Responsibility for changing poverty concepts and definitions rests with the Office of Management and Budget in the Executive Office of the President of the United States. The poverty thresholds for the continental United States in 1992 were $8,810 for one person, $9,190 for two persons, $11,570 for three persons, and $13,950 for four persons. Alaska and Hawaii have higher thresholds.**

Federally qualified HMOs: A *health maintenance organization (HMO)* which has been determined by the Department of Health and Human Services (USDHHS) to meet the standards set forth in Title XIII of the Public Health Service Act, in such areas as financial and administrative stability, quality, scope of services covered, and rate-setting practices. An employer who provides *health insurance* coverage to employees may be required to offer a federally qualified HMO as an alternative to other health benefits plans offered.

Fee-for-service: A method of billing **for health services under which a physician or other practitioner charges**

separately for each patient encounter or service rendered. Under a fee-for-service payment system, expenditures increase if the fees themselves increase, if more units of services are provided or if more expensive services are substituted for less expensive ones. This system contrasts with salary, per capita or other prepayment systems, where the payment to the practitioner is not changed with the number of services actually used. Compare *cavitation payment.*

Health Care Financing Administration: An office in the U.S. Department of Health and Human Services that has primary responsibility at the Federal level for administering ***Medicaid.***

Health care provider: Any person in one of the broad range of disciplines that specializes in providing ***personal health services. The*** **term** includes, but is not necessarily limited to, health educators, nurses, nurse-midwives, nurse-practitioners, psychiatric nurses, clinical psychologists, clinical social workers, and physicians.

Health insurance: In the traditional sense, health insurance is an arrangement for transferring and distributing risk associated with sickness or injury. It is an arrangement under which one party, an insurer, contracts to do something of value for another party, an insured or beneficiary, upon the occurrence of a specified harmful contingency (e.g., sickness or injury). Insurance allows the individual insured to pay a small, definite cost, a ***premium,*** for protection against paying for a large loss which might occur. In this background paper, the term health insurance is used broadly, to include both ***private health insurance coverage (e.g.,*** employer-subsidized coverage at the workplace or self-purchased coverage for individuals) and ***public coverage (e.g.,*** coverage **provided by** ***Medicaid*** and the ***Civilian Health and Medical Program of the Uniformed Services [CHAMPUS]). Pri-*** **vate** health insurance coverage is most likely to conform to traditional definitions of insurance, requiring individuals to pay premiums in exchange for being reimbursed for covered losses associated with sickness or injury. Private health insurance also includes so-called prepaid health plans (e.g., ***health maintenance organizations)*** **that,** while they require the payment of premiums, also are more likely to cover services not associated with sickness or injury (e.g., ***preventive services).*** Public coverage does not typically involve the payment of a premium, and public coverage plans differ in the extent to which they cover services not associated with sickness or injury. There is considerable debate about whether the purpose of health insurance should be to protect people from financial catastrophe or to assure them ***access*** **to a range** of health services. See also ***third-party payment.***

Health maintenance organization (HMO): An organization that, in return for prospective per capita *(cavitation)* **payments, acts as both insurer and provider of comprehensive but specified health care services to a voluntarily enrolled population. Prepaid group practices and individual practice associations are types of HMOs.**

Health outcome: A measure of the effectiveness of preventive or treatment health services, typically in terms of patient ***health status.*** Attributing changes in outcomes to health services requires distinguishing the effects of the many other factors that influence patients' health.

Health status: The state of health of a specified individual, group, or population. Health status maybe measured by obtaining **people's subjective assessments of their health; by one or more indicators of mortality and morbidity in the population, such as longevity or maternal and infant mortality; or by using the incidence or prevalence of major diseases. Most of these are, of course, measures of disease status, but they are used as proxies in the absence of measures of either objective or subjective health. Conceptually, health status is the proper outcome measure for the effectiveness of a specific population's medical care system, although attempts to relate effects of available medical care to variations in health status have proved difficult.**

Household: As defined by the Bureau of the Census within the U.S. Department of Commerce, all the persons who occupy a housing unit (i.e., a house, an apartment or other group of rooms, or a single room occupied or intended for occupancy as separate living quarters.

Hypokalemia: An abnormally low potassium concentration in the blood. It may be manifested by renal disease, by gastrointestinal disorders, and by disorders of the nerves in muscles ranging from weakness to paralysis.

Illness: Generally, any departure from good health.

Impairment: A physiological, anatomical, mental loss, or ''abnormality' caused by accident, disease, or congenital condition. An impairment may be the underlying cause of a ***disability.*** **Compare** ***disability.***

Inpatient: A person who has been admitted at least overnight to a hospital or other health facility (which is therefore responsible for his or her room and board) for the purpose of receiving health services. **Inpatient care** means **the care** given to inpatients.

Length of stay: The number of days during which a patient remains in a hospital or other institution, from admission to discharge. Ordinarily the day of admission is counted, but the day of discharge is not. When admission and discharge take place on the same day, the length of stay is generally considered to be 1 day.

Malignant hypertension: Severely high blood pressure that is characterized by the thickening of small arteries and by hemorrhaging.

Managed care: A term applied to a myriad of payment and/or delivery arrangements that attempt to control or coordinate enrollees' use of health services in order to control health care expenditures, to improve the quality of health care, or both. These arrangements range from organized health care delivery systems (e.g., staff model ***HMOs)*** **to specific features of health care plans (e.g.,** ***preadmission certification programs, utilization review programs,*** use of ***clinical practice guidelines).***

Medicaid: A federally aided, State-operated and administered program that provides medical assistance for low-income people meeting specific income and family structure requirements. Those eligible to receive Medicaid coverage include individuals with low incomes who are elderly, blind, have disabilities, are members of families with dependent children, or certain pregnant women and young children. States establish eligibility requirements that are subject to Federal guidelines. There is substantial variation among States in terms of eligible populations, range of services offered, limitations imposed on services, and reimbursement polices.

Medically needy Medicaid recipients: People who receive Medicaid under State "medically needy" programs. States have the option to offer Medicaid to medically needy people who would be categorically eligible for Medicaid but whose income and resources lie above the standards for ***Aid to Families with Dependent Children (AFDC).*** Each State sets its own medically needy resource and income standards up to 133.33 percent of State AFDC income standards.

Medium and large firms: As **defined by the U.S. Department of Labor's Bureau of Labor Statistics' 1989 Survey of Employee Benefits, establishments with 100 workers or more in all private nonfarm industries.**

Meta-analysis: The quantitative analysis of a large collection of results from individual studies for the purpose of integrating the findings.

Metropolitan area: A geographic area consisting of a large population nucleus, together with adjacent communities which have a high degree of economic and social integration with that nucleus. Metropolitan areas are also known as metropolitan statistical areas (MSA). An area qualifies for recognition as an MSA if: (1) it includes a city of at least 50,000 population, or (2) it includes a Census Bureau-defined urbanized area of at least 50,000 with a total metropolitan population of at least 100,000 (75,000 in New England). In addition to the county containing the main city or urbanized area, an MSA may include other counties having strong commuting ties to the central county. The territory outside metropolitan statistical areas is referred to as nonmetropolitan.

Metropolitan statistical area (MSA): See ***metropolitan area.***

Mortality rate: The death **rate, often made explicit for a particular factor (e.g., age, sex, or specific cause of death). A mortality rate contains three essential elements: 1) the number of people in a population group exposed to the risk of death; 2) a time factor; and 3) the number of deaths occurring in the exposed population during a certain time period (the numerator).**

National Ambulatory Medical Care Survey (NAMCS): Funded and administered by the U.S. Department of Health and Human Services, Public Health Service, National Center for Health Statistics. NAMCS is a continuing national probability sample survey of ambulatory medical encounters. It collects data on physician-patient encounters in the offices of a sample of nonfederally employed physicians classified as "office-based, patient care physicians. " Data are collected on patient characteristics and medical information, including expected source of payment.

National health expenditures: An estimate of national spending on health care made up of two broad categories: 1) health services and supplies, which, in turn, consist of ***personal health care*** **expenditures (the direct provision of health care), program administration and the net cost of** ***private health insurance,*** **and** government public health activities; and 2) research and construction of medical facilities.

National Health Interview Study (NHIS): Funded and administered by the U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Center for Health Statistics. A continuing nationwide sample survey in which personal ***household*** interviews are used to obtain information on personal and demographic characteristics, ***illnesses, injuries, impairments, chronic conditions, utilization*** of health resources, ***health insurance*** coverage, and other health topics.

National Medical Care Expenditure Survey of 1977 (NMCES): Funded and administered by the U.S. Department of Health and Human Services, Public Health Service, National Center for Health Services Research, now known as the ***Agency for Health Care Policy and Research [AHCPR]),*** and National Center for Health Statistics. A nationwide sample survey which gathered information on the use of health services, health expenditures, and health insurance of the civilian noninstitutionalized population.

National Medical Care Utilization and Expenditure Survey of 1980 (NMCUES): Conducted by the U.S. Department of Health and Human Services, Public Health Service, National Center for Health Statistics. A series of several related surveys on health, access to and use of medical (and dental) services, associated ***charges*** and sources of payment, and ***health insurance*** coverage during 1980. The household portion of

NMCUES consisted of: 1) a national household survey of a sample of the civilian noninstitutionalized population, and 2) a household survey of the Medicaid-eligible populations of the States of New York California, Texas, and Michigan. These two surveys each consisted of five interviews over a period of approximately 15 months to obtain information on medical *utilization,* expenditures, and other health-related information. A third survey, an administrative records survey, was designed to verify the eligibility status of the household survey respondents for the Medicare and *Medicaid* programs.

National Medical Expenditure Survey of 1987 (NMES): Funded and administered by the U.S. Department of Health and Human Services, Public Health Service, Agency for Health Care Policy Research. A nationwide sample survey which collected data on health status, use of health services, health insurance coverage, health care expenditures and sources of payment for the civilian population of the United States during the period from January 1 to December 31, 1987.

Nursing home: Generally, a wide range of institutions which provide various levels of maintenance and personal or nursing care to people who are unable to care for themselves and who may have health problems which range from minimal to very serious. The term includes freestanding institutions, or identifiable components of other health facilities which provide nursing care and related services, personal care, and residential care.

Office visit: As defined by USDHHS' National Center for Health Statistics for the purpose of the National Ambulatory Medical Care Survey, any direct personal exchange between an ambulatory patient and a physician, or members of his or her staff, for the purposes of seeking care and rendering health services.

Orthoptics: The treatment of defective visual habits, defects of binocular vision, and muscle imbalance by re-education of visual habits, exercise, and visual training.

Out-of-pocket expense: Personal expenditures for the portion of health care services not covered by third-party payments.

Outcomes (of health care): Patients' health. In assessments of access and quality, outcomes acquire importance to the extent that they have resulted from prior medical interventions. But attributing changes in patients' health to medical care requires distinguishing the effects of care from the effects of the many other factors regarding patients and their environments that also influence health.

Patient satisfaction: Attitudinal measures of patients' personal evaluations of aspects of health care providers and services. Patient satisfaction measures are inherently subjective because they reflect personal experiences, expectations, and preferences, as well as the standards patients apply when evaluating care. An example of a patient satisfaction measure would be to ask whether patients were satisfied overall or not completely satisfied with their most recent ambulatory visit.

Percutaneous transhuninal coronary angioplasty (PTCA): Minor heart surgery, in which a long wire catheter is inserted into the body near the groin and guided up through the patient's arteries to the arteries of the heart. A balloon at the end of the wire is inflated, squeezing any fat against the arterial wall, widening the passage, and thereby allowing more blood to flow to the heart. Also known as balloon catheter angioplasty.

Personal health services: Health services received by individuals: hospital care, physician services, dental services, other professional services, home health care, drugs and other medical nondurable, vision products, other medical durables, nursing home care, and other personal care.

Physician contact: As defined by the USDHHS' National Center for Health Statistics for the *National Health Interview Survey, any* contact with a physician directly or with a nurse or other person acting under the physician's supervision, whether in person or by telephone, for the purpose of examination, diagnosis, treatment, or advice, excluding physician contacts with hospital ***inpatients*** or for the purpose of mass screenings (e.g., in a trailer). Compare office ***visit.***

Point-of-service plan: A health insurance benefits program in which subscribers can select between different delivery systems (i.e., *health maintenance organization, preferred provider organization,* and out-of-system ***fee-for-service*** **providers) when in need of medical services, rather than making the selection between delivery systems at time of open enrollment. Typically, the *out-of-pocket* costs associated with** receiving care from HMO providers are less than when care is rendered by PPO or noncontracting providers.

Practice guidelines: See *clinical practice guidelines.*

Preadmission certification: A process under which admission to a health institution is reviewed in advance to determine need and appropriateness and to authorize a *length of stay* consistent with norms for the evaluation.

Precertification: See *preadmission certification.*

Preexisting condition: As defined by insurers, a condi***tion*** **existing before an insurance policy goes into effect and commonly defined as one which would cause an ordinarily prudent person to seek diagnosis, care, or *treatment.***

Preferred provider organization (PPO): A type of group health plan which is a network of *health care providers* **and** facilities who agree to furnish certain services for declared fees lower than their usual prices. The covered member is then encouraged, but not required, to obtain health care services from a preferred

provider, with the incentives of lower deductibles or copayments.

Prehospitalization testing: Laboratory and other tests done prior to hospitalization on an outpatient or ambulatory basis, in order to reduce expenditures.

Premium: The price or amount which must be paid periodically (e.g., monthly) to purchase insurance coverage or to keep an insurance policy in force. Virtually all health insurance programs require the payment of a premium by the *beneficiary,* and/or by **someone else (such as the employer) on the beneficiary's behalf. Premiums paid to *health maintenance organizations (HMOs)* or similar** organizations are often called ***cavitation*** payments.

Preventive health services: Services intended to prevent the occurrence of a disease or its consequences. Preventive health care includes health care programs aimed at warding off ***illnesses (e.g.,*** immunizations), early detection of disease (e.g., Pap smears), and inhibiting further deterioration of the body (e.g., exercise or prophylactic surgery). Preventive medicine is also concerned with general preventive measures aimed at improving the healthfulness of the environment and with the promotion of health through altering behavior, especially using health education. Preventive health services are sometimes categorized as primary, secondary, or tertiary. Primary prevention is aimed at reducing the incidence of a disease or health problem; **secondary prevention is** aimed at reducing the prevalence of a problem by shortening the duration among those who have the problem; and tertiary prevention is aimed at reducing complications. Compare ***treatment services.***

Primary care: A familiar but elusive term that is variously considered to be: 1) first contact care; 2) an array of services that provides certain attributes including comprehensiveness, coordination, continuity and accessibility; 3) care provided by certain provider disciplines, including general or family practice, general internal medicine, and primary care nurse practitioners or physician's assistants; and 4) the de facto care that most people receive for most of the problems that bother them most of the time.

Private health insurance coverage: Insurance that is not ***public coverage.*** Includes direct and indirect group coverage (e.g., ***employment-based group insurance plan),*** **as well as** individual and family policies. See ***health insurance.***

Prepaid health plans: See *health insurance.*

Procedure: A medical technology involving any combination of drugs, devices, and provider skills and abilities. Appendectomy (removal of an appendix), for example, may involve at least drugs (for anesthesia), monitoring devices, surgical devices, and physicians', nurses', and support staffs' skilled actions.

Process: The activities of health professionals in caring for patients. Process measures acquire validity as indicators of access and quality only to the extent that they have been found likely to improve or harm patient *outcomes.*

Prospective payment: Any method of paying hospitals or other health programs in which amounts or rates of payment are established in advance for a defined period (usually a year). Institutions are paid these amounts regardless of the costs they actually incur. These systems of payment are designed to introduce a degree of constraint on charge or costs increases by setting limits on amounts paid during a future period. In some cases, such systems provide incentives for improved efficiency by sharing savings with institutions that perform at lower than anticipated costs.

Provider: See ***health care provider.***

Public coverage: ***Third-party*** coverage that is chiefly administered, cperated, or financed by the Federal or State Governments. Examples are ***Medicaid,*** **Medicare, and *CHAMPUS.*** Compare ***private health insurance coverage. See health insurance.***

Pyelonephritis: Inflammation of the kidney due to bacterial infection.

Quality assurance: Activities to safeguard or improve the *quality of medical care* by assessing quality and taking action to correct any problems found.

Quality of medical care: Evaluation of the performance of health care providers according to the degree to which the process of care increases the probability of outcomes desired by the patients and reduces the probability of undesired outcomes, given the state of medical knowledge. Which elements of patient outcomes predominate depends on the patient condition.

Quasi-experimental **design: A research design involving an experiment that has a treatment, an outcome measure(s), and experimental units, but does not use random assignment to create the comparisons from which treatment-caused change is inferred. Instead, the comparisons depend on nonequivalent groups that differ from each other in many ways other than the presence of a treatment whose effects are being tested. The task confronting those who try to interpret the results from quasi-experiments is basically one of separating the effects of a treatment from those due to the initial noncomparability between the average units in each treatment group. Compare *experimental design.***

RAND Health Insurance Experiment (HIE): A large-scale **controlled trial in health care financing with the objective of examining the effects of different organizational and financial arrangements for delivering health care services.**

Robert Wood Johnson Foundation National Health Access Surveys: In 1978, 1982, and 1986 the Robert Wood Johnson Foundation sponsored national tele-

phone surveys. The 1982 survey consisted of telephone interviews of 3,000 families, intended to represent a cross-sectional sample of the U.S. population, and an oversampling of approximately 1,800 families with incomes below ***the Federal poverty level,*** **comprising a total of 6,610 individuals.** Information was **collected** on one **adult and** one **child (if present)** from each **household. The 1986 telephone survey sampled 10,130 individuals. Persons** with ***chronic*** or serious medical ***illnesses*** were oversampled to allow adequate evaluation of the ***access*** problems of those with illnesses, but the study group was weighted to represent the U.S. population as a whole. Because the primary focus of these surveys was on access, and not on differences by payment source, some of the reports compare the ***uninsured*** with the insured but do not differentiate between ***Medicaid*** and ***privately insured*** persons, nor do they always separate results for persons under and over age 65.

Severity of illness: The extent and intensity of a patient's ***disease*** or ***condition,*** indicated by the likelihood that the patient will suffer permanent ***impairment, disability,*** or death if no further treatment is provided. The likelihood of impairment, disability, or death depends on which diseases and conditions are present and the stage they have reached in the usual course of the disease or condition. Some attempts to measure severity of ***illness*** have **focused** on **the patient's principal disease or condition, the presence of coexisting disease,** and the stage of the disease. Other **attempts have emphasized the physiologic** status of the patient (e.g., measuring the extent of departure from "normal' values for a variety of physiologic functions such as the oxygen carrying capacity of the blood, body temperature, pulse rate, etc.). Presently, no single approach to severity of illness measurement has received widespread acceptance. Compare ***case mix.***

Single-payer prospective payment program: See *prospective payment.*

Small establishments: As defined by the U.S. Department of Labor's Bureau of Labor Statistics' 1990 Employee Benefits Survey, private nonfarm firms with fewer than 100 workers.

Stapedectomy: The removal of the stapes (the innermost ossicle in the ear), and replaced with various prostheses and tissues. Often used to treat otosclerosis (the formation of spongy bone in the ear, resulting in progressively increasing deafness).

Statistical significance: A judgment, based on commonly agreed to statistical principles, that there is relatively little likelihood (typically from below 1 to below 5 percent) that an observed relationship between or among ***variables*** has occurred by chance.

Stop loss provision: The maximum insured individual's outlay or ***out-of-pocket expense,*** **per a specified** time period (e.g., a year), **usually excluding the plan *deductible.***

Strabismus: A deviation of the eye that the patient cannot overcome without aid. The condition is due to a lack of parallelism of the visual axes of the eyes.

Third-party payment: Payment by a private insurer or government program to a health care provider for care given to a patient.

Treatment services: Services intended to cure or ameliorate the effects of a disease or other health problem once a problem has occurred. Compare ***preventive services.***

Underinsured: People with *public* or *private insurance* policies that do not cover all necessary medical services, resulting in ***out-of-pocket expenses*** that exceed their ability to pay.

Uninsured: People who lack ***private*** or ***public health insurance coverage.***

Utilization: Use; commonly examined in terms of patterns or rates of use of a single service or type of service, e.g., hospital care, physician visits, prescription drugs. Measurement of utilization of all medical services in any given period is sometimes done in terms of dollar expenditures. Use is also expressed in rates per unit of population at risk for a given period, e.g., number of admissions to a hospital per 1,000 persons over 65 per year or number of visits to a physician per person.

Utilization review: Evaluation of the necessity, appropriateness, and efficiency of the use of medical services based on some specified criteria. In a hospital, this includes review of the appropriateness of admissions, services ordered and provided, length of stay, and discharge practices, both on a concurrent and retrospective basis. Utilization review can be done by a peer review group, a public or private agency on its own behalf, or by a vendor.

Validity: A measure of the extent to which an observed situation reflects the true situation or an indicator measures what it purports to measure.

Variable: In research, a factor that is changeable and subject to variation. The independent variable establishes the value of the dependent variable(s) when a defined relationship exists between them.

Well-child care: ***Preventive health care*** for children, including immunizations, health education, parental guidance, physical examinations, and other tests that screen for illness or developmental problems.

Appendix C

Conceptual Framework and General Methodological Issues

Introduction

Today's U.S. health care environment is exceedingly complex. Almost 250 million individuals live in the United States (156). Each of these individuals can have many different types of health problems or none at all. There are also many types of health care providers organized in myriad ways, providing a broad range of services and care (125a,160). Individuals' health status depends not only on the health services they receive but on their inherited characteristics, the physical environment in which they live or have lived, the social environment, their occupations, and their individual behaviors (24,174,188). In fact, there is considerable debate about the extent to which health services affect health status (15,91).

This appendix provides an overview of the conceptual framework used in developing this Background Paper, with a focus on the potential roles that insurance coverage may play in access and outcomes. It also includes a brief discussion of the conceptual and methodological limitations inherent in the types of research reviewed for OTA's assessment.

Overview of Conceptual Framework

The preliminary conceptual framework developed in this background paper is adapted from the model developed by Aday, Andersen, and others (3,6,7). Aday, Andersen, and their colleagues define access as:

> those dimensions which describe potential and actual entry **of a given population to the health care delivery system (7).**

They further define "equity of access" as:

> services [that] are distributed on the basis of people need for them. Inequity exists when one's race, **income. . .or insurance coverage. . are important predictors of realized access (7).**

A summary of the model of access used in this paper is shown in figure C-1. The model includes factors ***afflecting health*** that may not be affected by access to personal health services. These factors are not of primary consideration in this background paper, except to the extent that they have been addressed in analyses of the impact of insurance status on utilization, the process of care, or health outcomes.[1] The model focuses on indicators of potential access, realized access, and health outcomes.

Indicators of ***potential access*** **to health services are used to suggest a higher likelihood of access problems. They include characteristics that make persons** more vulnerable to health policies that may have deleterious effects on access. These characteristics are of three types: predisposing variables; need; and enabling characteristics (7). Insurance status is considered an enabling characteristic, that is, it represents a means by which individuals can gain entry to the health care system; its potential impact on entry into the system and health outcomes is discussed more fully below. *Realized access indicators* reflect actual access to care and include measures such as ***utilization*** of health services **(7). Unlike the model developed by Andersen, Aday and their** colleagues, OTA's **conceptual model** draws a distinction between mere use of services (termed utilization in much of health services research) and the way care is delivered once an individual gains access. OTA calls the latter the ***process*** of care.

OTA used a combination of its **judgment and prevailing** use in the literature to determine in which case the views of the patient or provider would prevail in order to designate an aspect of care "utilization" or "process." For example, a patient usually makes the decision to make an appointment with a health care provider for an initial assessment of a perceived health problem. Health care providers are likely to have more influence on specific ways in which the care is delivered (e.g., whether the patient is examined for breast lumps, whether an angiography [a test to detect heart muscle and valve abnormalities and atherosclerotic blockages of the coronary arteries] is used).

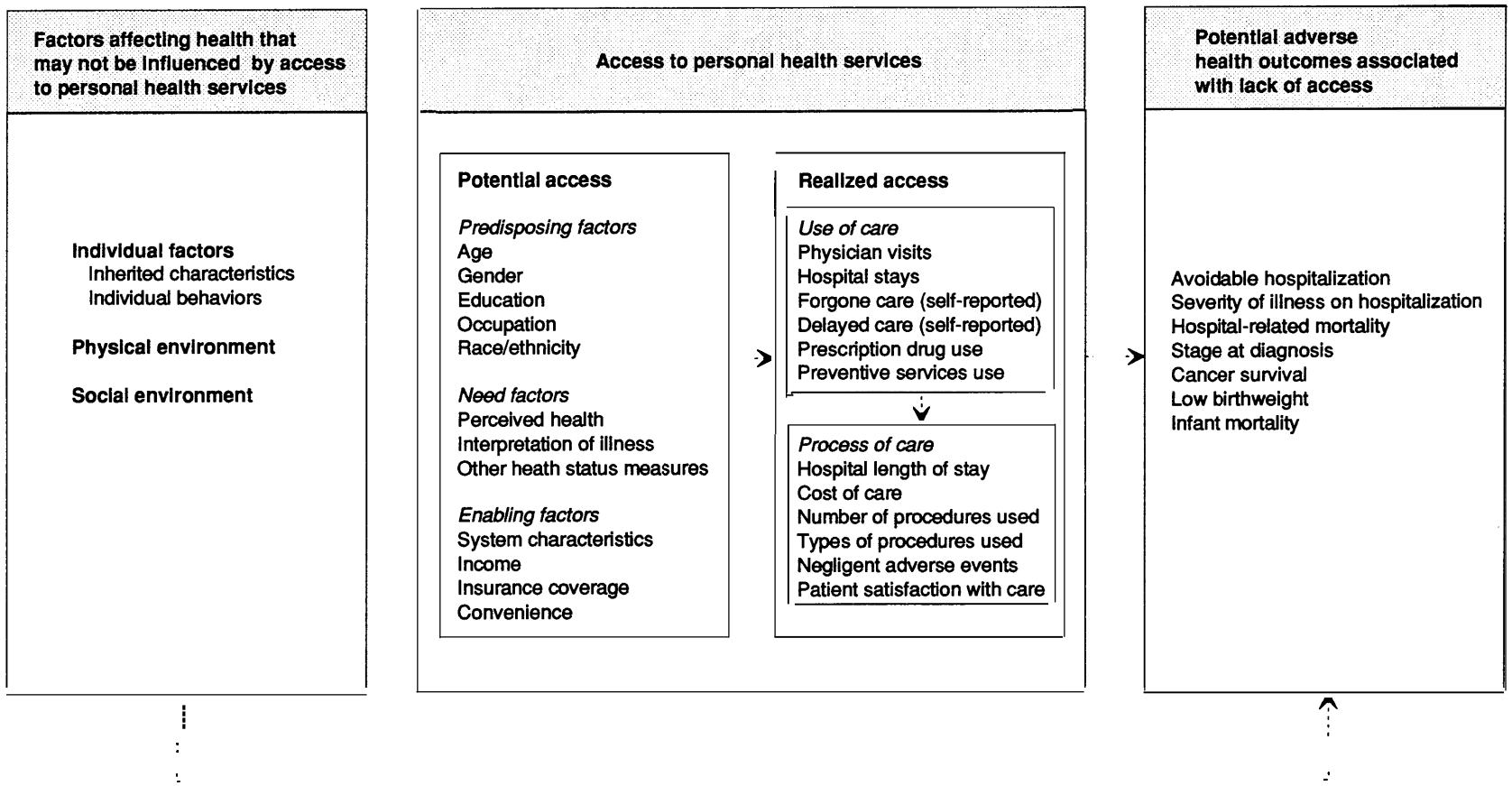
Aday, Andersen and their colleagues did not include individual ***health outcomes,*** such as improved or worsened health status, in their model of access. Health outcomes represent, perhaps, the ultimate measure of equity in access, but health outcomes maybe more likely than utilization and process to depend on factors other than access to health services.

The Potential Roles of Insurance Coverage in Utilization, Process, and Outcomes

Insurance is one of many factors in a conceptual model of potential access, utilization, process, and health (e.g., figure C-l), but in considerations of improving access and health in the contemporary United States, it has assumed an important role, and is the focus of this background

[1] **They will be considered in more detail in OTA's final report for this assessment.**

Figure C-1—An Interim Conceptual Framework for the Analysis of Relationships Among Insurance Coverage, Other Factors, Use and Process of Care, and Individual Health Outcomes



SOURCE: Office of Technology Assessment, 1992, based on Warner and Murt, 1984; Andersen, et al., various years; Weissman and Epstein, 992; Mechanic, 1979, Mechanic, 1989b; and studies reviewed for the interim report.

paper. Whether or not a **person has health insurance and the** extent of the insurance coverage can potentially affect whether or not a person gains access to care and the way that care is delivered. Common sense, clinical judgment, and much research literature suggest that the use of, and the process of, health services may in many cases affect an individual's health. Figure C-2 summarizes the progress of a person through the medical care system, and can be used to suggest all the decision points at which medical care can make a difference to health. In addition, it suggests all the decision points at which financial barriers can ***potentially*** affect utilization of health care and health status. Most basically, individuals completely lacking health insurance may delay or forgo care that has the potential to dramatically improve their health and functioning and even prevent premature death. But even when one has insurance, incentives embedded in the pattern of covered services can affect health care utilization and the process of care. These incentives can be direct or indirect, intentional or inadvertent, applied on the demand or supply side of care, positive or negative, coercive or voluntary, and provided on a one-time or a periodic basis (36,174). The demand-side/supply-side distinction is one that has been difficult to make based on existing research. In the past, many analyses assumed that insurance-based and other financial incentives were most likely to affect ***patients'*** decisionmaking (105,108); the extent to which financial factors influence providers' decisions has been hotly debated (2,44,47,187). Currently, it is becoming more generally accepted that financial incentives affect the behaviors of both patients and providers (107), but additional information is needed about the ways in which providers and patients make decisions in response to insurance-based and other incentives. In some cases, these decisions may be joint, and in other cases they may be unilateral.

Conceptual and Methodological Limitations in Available Research

A variety of conceptual and methodological limitations plague studies designed to assess the impact of insurance coverages on the timing, location, sources, and outcomes of care. These include a lack of effectiveness data for many procedures and services; problems in defining and measuring outcomes; lack of baseline information to reliably and validly measure preexisting health status; the cross-sectional nature of much of the data; measurement problems associated with survey, claims and discharge **data;** lack of prospective studies; and the broad variety of insurance coverages. In addition, research in this area is impeded conceptually because fully satisfactory theoretical models of the way in which financial factors affect health-related behaviors are not available.

Effectiveness **Data**

While almost all covered services may be beneficial to some extent for at least some people, analyses of the true impacts of insurance coverage on health are limited because efficacy[2] information is lacking for many health services (148) and appropriateness[3] and effectiveness information is lacking for even more health services (19,43). For many procedures and services, then, it becomes difficult to say whether variations in the process of care associated with different levels of insurance coverage are important to patients' health.

According to an earlier estimate by Kerr White, only 10 to 20 percent of medical and surgical ***procedures in*** use have been evaluated for their efficacy through controlled trials (144). Although with increasing amounts of funding for clinical trials and technology assessment since 1980, the percentage of evaluated medical technologies may have increased somewhat, the number of technologies has also increased, and Kerr White's estimate may still be accurate.

Problems in Defining and Measuring Outcomes

It is perhaps surprising that health services research using health outcomes as an endpoint of analysis is a relatively new endeavor. Even now, such research is typically costly, cumbersome, time consuming, and hard to manage, in part because of the difficulties of defining appropriate outcomes, collecting reliable and valid data, and relating apparent outcomes to variations in care (97,131,137,148).

There are few, if any, health outcomes that are indisputable measures of differences in the provision of care based on ability to pay. The health outcome measures used in research on the relationships among insurance, access, and patient health outcomes are all imperfect, both in concept and calibration. Some measures (e.g., adverse birth outcomes, in-hospital mortality) maybe used because they are the only measures available on the large databases that are generally used in the absence of prospective experimental research. Other measures that may be specially constructed for studies (e.g., "avoidable

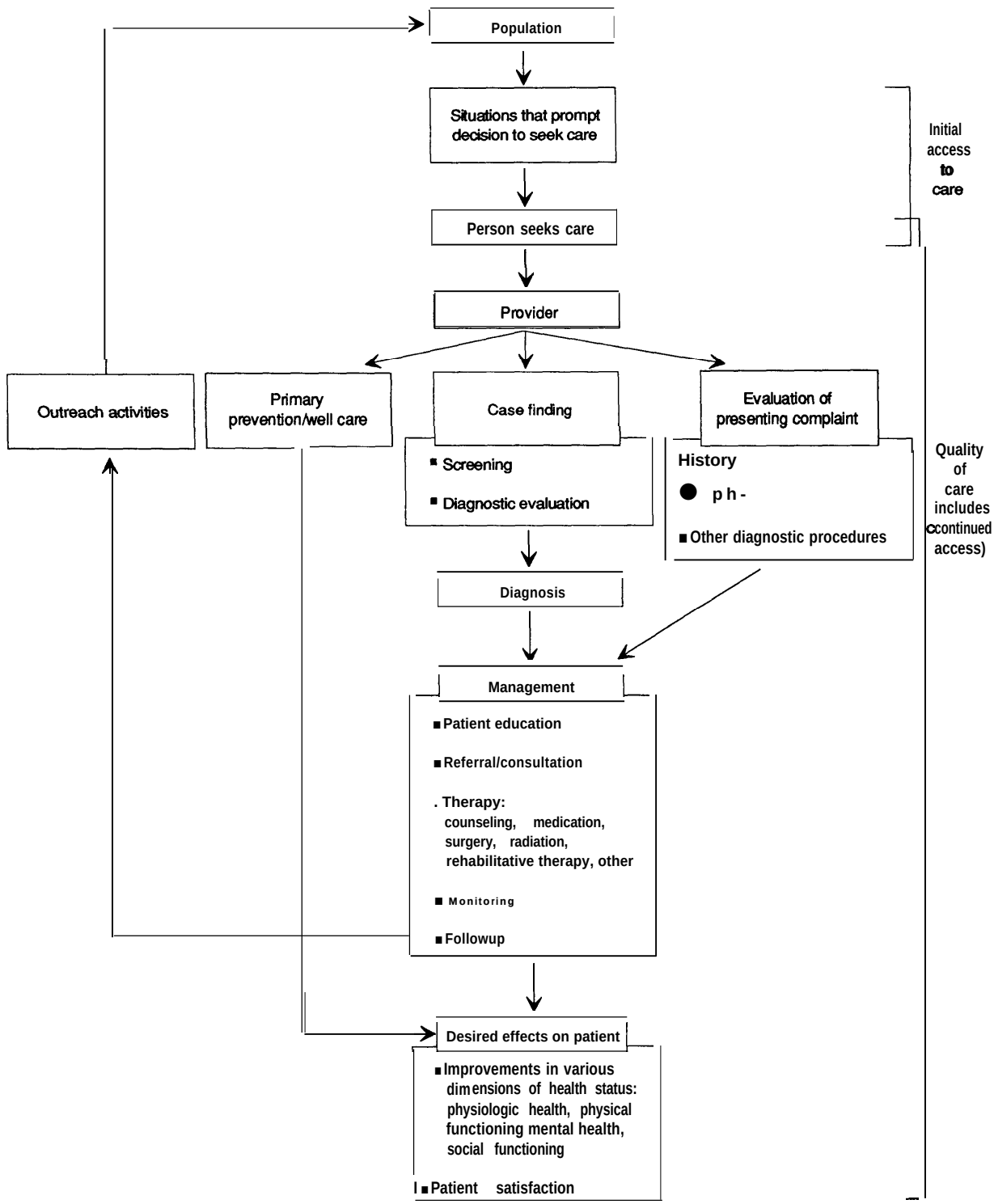
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2 Efficacy has been defined by OTA as the probability of benefit to individuals in a defined population from a medical technology applied to a given medical problem under ideal conditions of use.

3 "Appropriate" health care has been defined as "care for which the expected health benefit exceeds the expected negative consequences by a wide enough margin to justify treatment" (5).

4 Effectiveness is a particular application of *efficacy*, that is, it reflects the performance of an intervention under ordinary conditions by the average practitioner for the typical patient.

Figure C-2—Progression of a Person Through the Spectrum of Medical Care



SOURCE: U.S. Congress, Office of Technology Assessment, *The Quality of Medical Care: Information for Consumer's, OTA-H-386* (Washington, DC: U.S. Government Printing Office, June 1988).

hospitalizations"[5] rely heavily on clinical judgment, which is itself highly variable (148). Few studies have the resources to collect the kinds of patient health information that have been developed and validated in such studies as the RAND Health Insurance Experiment (86a, 87).

For example, information about in-hospital mortality (a patient's death in the hospital) is relatively easy to collect, but questionable to use as an indicator that variations in the quality of care are associated with different sources of payment (or no payment). The inadequacy of measures of patient health on admission-probably the most likely predictor of an in-hospital death—presents a significant problem because poorly insured or uninsured patients may be more likely to be sicker on admission. In fact, measures of relative severity of illness on admission have themselves been used as indicators of poor pre-hospital (ambulatory) care.

"Avoidable hospitalizations" are used as indicators of a lack of timely and effective ambulatory care (14,179), yet there can be many nonfinancial sources of avoidable hospitalizations that are not measured, including variations in physician practice patterns, patient preferences, and, of course, patients' health status. It may be difficult to disentangle the financial from the nonfinancial sources of variation.

Problems in Defining and Measuring Insurance Status

Studies differ markedly in the ways in which groups of insured and uninsured individuals are defined. For example, some studies include individuals covered by Blue Cross and Blue Shield plans as part of a privately insured group (95), and others exclude Blue Cross and Blue Shield plans from their definitions of private coverage and include only patients with "commercial" (private, for-profit) insurance (54). One study equated "the uninsured" with individuals living in low-income areas and not covered by Medicaid, and compared information on them with information from individuals living in high-income areas and not covered by Medicaid, assuming that the latter are covered by private insurance (72). Some studies combine those covered by Medicaid with uninsured individuals to form a group (for study purposes) of "poorly insured" individuals (62). Some studies aggregate data at the hospital level, comparing outcomes at hospitals with varying proportions of insured and uninsured or "poorly insured" patients (62). These variations make comparisons across studies, and make syntheses of the studies difficult to interpret in terms of the effects of specific financial incentives. Finally, a source of payment (e.g., Blue Cross) recorded from patients' self-reports at the time of admission may turnout to be invalid. Different providers and facilities may have different capabilities to validate whether a source of third party payment exists.

Definitions of "uninsured" are similarly difficult to construct. The concern about the financial impact of being uninsured on patients' health is that health care providers and facilities will not be reimbursed for care delivered; therefore, they may provide less care and attention. The terms "self-pay" and "no charge" are the terms most frequently interpreted as "uninsured," but no one appears to have tested the extent to which providers and hospitals remain unpaid by those whose expected source of payment is "self-pay" or "no charge." These terms are recorded at a particular point in the patients' episode of care and not investigated for their long term validity. For example, Medicaid coverage may be pending at the time of -admission, or an application for Medicaid may be submitted during the episode of care.

Having large numbers of patients in a data set may compensate for some of the problems associated with the problems inherent in defining and measuring health insurance status.

Lack of Information to Reliably and Validly Measure Preexisting Health Status

Individual health outcomes following an episode of care or a specific intervention depend on a multitude of factors, not least of which is the individual's health at the beginning of the episode of care. Thus, to conclude that specific variations in insurance coverage have some effect on utilization, process, and outcomes on an aggregate basis, researchers must account for individual differences in health that precede the episode of care or change in insurance status. Unfortunately, there is no one factor or set of factors that accurately describes an individual's overall health status and his or her likelihood of becoming sicker (29,68,148). Data on available factors that would appear relevant are often collected after an episode of care or have been demonstrated to be valid only in certain areas of care (e.g., for intensive care units) (148). Attempts to make such adjustments have included rough proxies for likely health status such as various combinations of age, gender, income, and secondary diagnoses during a hospitalization (57).

Measurement Problems Associated With Survey and Archival Data

Discussions of the limitations in available data are replete in the literature reviewed for this background paper. As noted below, efficacy and effectiveness data from randomized clinical trials and other experimental studies are considered far superior to data collected in

[5] The Billings and Teicholz study [6] a measure of avoidable hospitalizations that was already being employed as a quality assurance/utilization review screen in the hospitals in their study (14).

Box *C-1-Characteristics, Advantages, and Disavantages of Selected Secondary Databases*

Administrative Databases

Administrative databases are created primarily to monitor utilization, to determine the consumption of health care resources, and to ascertain the capacity to supply services. Administrative data sets are further subdivided into claims data, data on hospitals, and data on providers. Claims data are gatherd and maintained at the level of the patient in order to report charges and monitor the use of medical services and resources. In general, claims data include demographic information concerning the patient, discharge diagnoses, charges incurred, location of the service, and provider information. Sources of claims data that have been used in health services research include Medicare data Medicaid data, State utilization databases, and private sources of claims data.

Individual provider data are gathered to characterize providers, identify human resources, and monitor utilization. The contents may include data on personaI characteristics of the provider, professional data, and licensing or specialty information. Data on providers are useful in a variety of studies, and these databases may also serve as a sampling frame.

Hospital data are gathered to characterize hospitals, identify available resources, and monitor resource utilization. The contents may include information such as size, financial reports, ownership, teaching status, and location. These data are useful in analyses employing institutional characteristics and may also prove useful as a sampling frame. To date, claims and other administrative databases have not been designed to measure medical effectiveness in terms of outcomes or the quality of care in terms of process. Factors affecting the usefulness of administrative databases for health services research, includling the analyses reviewed in this background paper, include:

* variations in the level of detail;
* lack of, or inconsistency in, common, **unique individual patient identifiers;**
. concerns about the specificity and validity of some variables;
*** limited availability of clinical information; and**
• limited availability of information on nonphysician providers.

Clinical Databases

Longitudinal, clinical databases contain detailed clinical information on individual patients. These data sets may be generated as the result of specific studies, such as clinical trials or observational studies, or they maybe collected at individual geographic sites as part of a clinic's or hospital's ongoing data collection effort.

clinical databases are unlike administrative databases in that they contain detailed clinical information on individual patients, although, as with the administrative databases, the amount and type of information may vary greatly. Clinical studies generally employ standardized definitions and collect data at definite intervals for specific

nonexperimental studies such as surveys, administrative databases and other secondary data sources.

Primary data collection may require highly skilled staff to compile information through medical chart abstraction or personal interviews (131). One alternative to traditional chart-based review is so-called "outcomes research" using large databases such as those containing insurance claims or hospital discharge abstracts (131,184). Large databases also have limitations and their usefulness in assessing effectiveness is just now being tested (131,162, 163).

Secondary data sources[6] include administrative databases, clinical databases, Federal medical and health services research databases, disease registries, and death registries (164). Most of the studies reviewed in this background paper have used one or more of these secondary data sources, with varying degrees of success. Each database has its associated flaws, and it may be necessary to link the databases to compensate for the shortcomings of any one data source in order to track specific patients' progress through the health care system. For example, only claims databases are likely to contain information about insurance coverage. Attempts at linkages (bringing together two separately recorded pieces of information concerning a particular individual or family) are not always successful (164) (box C-l).

As implied in the review by the U.S. Department of Health and Human Service's (USDHHS's) Agency for Health CarePolicy and Research (box C-l), each database

6 Secondary & are &~ collected for some purpose other than the immediate research project. In many cases, secondary data exist prior to the beginning of the research. Primary data are data collected exclusively for a research project (164).

periods of time; these are two clear advantages in the analysis of data. However, the populations involved are often narrowly selected, the data collected are typically relevant only to the study question, and data collection generally stops at the end of the study. Therefore, the usefulness of these data sets maybe relevant only for the original purpose for which they were designed..

Data sets collected at individual geographic sites may be broader in their content, and data collection efforts are not limited by the length of the study. The population mayor may not be more representative than populations employed in some clinical studies. However, data will only be collected when an individual presents for care at that facility, standard definitions may not be employed across sites, and the data collected will depend on the clinical needs of the patient. The result is that the researcher has to deal with problems of missing data, uncertain meaning of some variables, and uneven followup of patients.

Federal Medical and Health Services Research Databases

There were 498 health, social, and demographic data projects reported for inclusion in the Fiscal Year *1988* U.S. Department of Health and Human Services Data *Inventory. These projects varied in the* purpose, scope, frequency of data collection, and analysis of the data collected The projects often involved a single collection of data however, some projects included ongoing collection of individual information and resemble clinical data sets in that respect. In most cases, individually identifiable data are not generally available; therefore, individual linkages are not possible. Their usefulness may also be limited by their design and timeliness.

Disease Registries

Disease registries are created when a disease is considered to be of sufficient importance to the publihealth to have its occurrence reported to the authorities. Disease registries, or treatment registries, may also be created when an organization or group of clinicians compile ongoing registries of patients with certain diagnoses or who receive specific treatments. These registries are compiled to increase understanding of the natural history of the *or treatment. The registries may require mandatory or voluntary reporting, and the amount of information collected and followup conducted may vary. An example of a disease registry is the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) database.

Death Registries

The Natioinal Death Index (NDI) is a computerized central file of death record information, including the cause of death. It is compiled from magnetic tapes submitted to the National Center for Health Statistics by the State vital statistics offices. In addition, States and local governments may keep their own death registries.

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Agency for Health Care Policy and Research, *Report to Congress: The Feasibility of Linking Research-RelatedData Bases to Federal and Non-Federal Medical Administrative Data Bases* AHCPR Publication No. 91.0003 (Rockville, MD: U.S. Department of Health and Human Services, Public Health Sea'vice, Agency far Health Care Policy and Research, April 1991).

provides only a small piece of the overall patient health picture. In general, using records of claims for third-party payment can lead to undercounting of individuals' use of health services. In the use of Medicaid records to detect the number of prescriptions filled after a cap on the number of prescriptions that could be paid for by Medicaid, for example (127,128), patients could have had prescriptions filled using other sources of funding (e.g., out of pocket).

Some studies have been based on surveys that elicited from individuals the kinds of information that cannot easily be obtained from archival sources such as medical administrative records (113,1 14,136,167,180). However, surveys may focus on the reconstruction of processes that have occurred prior to the study and are thus dependent on respondents' abilities to know, recall, and relate accurately relevant events (e.g., the occurrence of a health problem, a physician or other medical visit, the existence and nature of health insurance coverage). Adult respondents may not know such facts as when their child visited a health care provider (153,154,155), or may not recall that they themselves visited a health care provider.

Research validity may be threatened by answers that respondents think are socially desirable or answers that may intentionally sabotage the research project (132). Biased responses can also be unconsciously elicited by the interviewer or question (132). For example, individuals may overstate or understate their insurance coverage, their use of health services, or their health, depending on what they perceive to be the "demand characteristics" of the survey situation. Some surveys (e.g., the National Medical Expenditure Survey [NMES] conducted by the USDHHS) try to compensate for some of the drawbacks in survey research by conducting collateral research (e.g., by surveying employers, insurers, and medical providers of the household survey respondents), and by questioning

Table C-l—Medical Care Benefits by Type of Employer: Percentage of Full-Time Participants[a] by Coverage, With Selected Cost Containment Features, Non-Health Maintenance Organization Coverage Only[b]

Cost containment feature	Medium and large firms, 1989[c]	Small establishments, 1990[d]	State and local governments, 1990*
Higher rate of payment for generic prescription drugs	14%	159'0	22%
Higher rate of payment for mail order drugs	10	6	7
No or limited reimbursement for nonemergency weekend admission to hospital	12	14	9
Separate deductible for hospital admission	10	10	20
Incentive for prehospitalization testing	42	49	46
Prehospital admission certification requirement	44	59	63
Higher rate of payment for delivery at birthing center	20	21	15
Incentive to audit hospital statement	5	7	6
Care subject to utilization review	23	27	33

[a]It is important to note that: 1) not all full-time employees participate in plans offered by employers, and 2) the U.S. Department of L.abets Bureau of Labor Statistics (BLS) distinguishes among medical care, dental *ewe,* and vision care. According to BLS, medical care benefits were provided to 92 percent of employees in medium and large firms, 69 percent of full-time employees in small firms, and 93 percent of full-time employees in State and local governments. Workers are considered participants only if they elected a pian. This table applies to cost-containment provisions affecting medical care benefits only.

[b]BLS did not tabulate data for health maintenance organizations because, according to BLS, HMOs have their own inherent cost containment features. BLS defines HMOs as arrangements in which a prescribed set of benefits is provided to enrollees for a fixed payment. HMOs were classified in the survey as group/staff type organizations, with services provided in central facilities, or individual practice associations (I PAs), with providers working from their own offices. Preferred provider organizations, in which participants are free to choose any provider but higher benefits are offered for services rendered by designated health care providers, were not included as HMOs. Of employees in medium and large firms participating in HMOs, 44 percent participated in group/staff organizations, 53 percent participated in IPAs, and 4 percent participated in an arrangement that combined the group/staff and IPA models. Only 14 percent of employees in small firms participated in HMOs.

[c]Medium and large firms are establishments with 100 workers or more in all private nonfarm industries, excluding (in the 1989 survey) firms in Alaska and Hawaii. According to BLS, its survey of these firms provides representative data on 32.4 million full-time employees.

[d]Small establishments are defined as those private nonfarm firms with fewer than 100 workers. According to BLS, its survey of these firms provided representative data on 40.8 million full- and part-time employees. Data shown in this table are for full-time employees only. According to BLS, insurance benefits—sickness and accident insurance, long-term disability insurance, medical care, dental care, and life insurance—were available to one-tenth or fewer part-time workers. No further details were provided on benefits available to part-time workers in BLS's report.

[e]According t· BLS, these data represent about 13 million full-time employees i„ all State and local governments in the 50 States and the District Of Columbia. Detailed data for 1.6 million part-time employees were not provided.

SOURCES: Medium and large firms: U.S. Department of Labor, Bureau of Labor Statistics, *Employee Benefits in Medium and Large Firms, 1989,* Bulletin 2363 (Washington, DC: Government Printing Office, June 1990); Small firms: U.S. Department of Labor, Bureau of Labor Statistics, *Employee Benefits in Small Private Establishments, 1990,* Bulletin 2368 (Washington, DC: Government Printing Office, June 1990); State and local governments: U.S. Department of Labor, Bureau of Labor Statistics, *Employee Benefits in State and Local Governments,* 1990 (Washington, DC: U.S. Government Printing Office, 1991).

some individuals multiple times in the course of a year (123).

Lack of Experimental Studies

In any synthesis of scientific literature, more credence is generally given to results of studies using an experimental design. Such a design would randomly assign individuals to having or not having health insurance coverage.[7] Perhaps because the idea that having health insurance coverage is essential to health has become so well-accepted in the United States, there have been no truly experimental studies to test the effects of not having insurance. Thus, all of the studies rely on non-experimental design (e.g., the use of survey and archival data). These may suffer from the serious problem of patients' self-selection, which can be only partially compensated for by making adjustments for patients' health.

Variety of Financial Incentives

An enormous variety of insurance-related and other financial incentives has been developed to either increase or decrease health care utilization, improve the process of care that is delivered, enhance health outcomes and contain health care costs (e.g. table C-l). For example, efforts to increase apparently appropriate utilization of health services have included providing care at no out-of-pocket cost to patients (e.g., for prenatal services), expanding eligibility for Medicaid (e.g., Public Law 101-508), covering preventive services under Medicare (151; Public Law 101-508), mandating that certain benefits be covered by insurance, and providing incentives for employers to provide insurance to their employees. Efforts to decrease inappropriate utilization have included the redesigning of health benefits packages, the restructuring of delivery systems (e.g., managed care initiatives), requiring of higher patient cost-sharing, increasing prices, and use of single-payer or all-payer

7 As discussed below in appendix F, the RAND Health Insurance Experiment assigned participants to varying levels of cost-sharing for health services (including no cost-sharing, or "free care") and not to being insured or uninsured (21,101,102).

prospective payment programs for hospital payment. Some of the efforts to decrease utilization have included attempts to ensure that the quality of the health services delivered does not degenerate.

One difficulty in evaluating the impact of insurance coverage is that providers and consumers may face a number of different incentives simultaneously; singling out the impact of a single one can be difficult, and individual studies vary in the extent to which they take into account the particular historical, social, and cultural contexts in which patient and provider behavior is embedded. Perhaps a more important issue is that the types and levels of benefits covered by insurance plans, and the ways in which plans attempt to structure the delivery of care, can vary considerably.[8] Most studies compare only broadly defined groups of uninsured, publicly insured and/or privately insured individuals.

Medicaid, in itself, is a difficult program to interpret for a variety of reasons (e.g., coverage of participants for only short periods of time, low provider reimbursement rates (154), possibly worse health status of individuals who apply for Medicaid, wide variations in coverage policies by State, poor data) and attempts to evaluate its impact have been plagued by methodological problems (109).

Inadequate Theoretical Models of the Economics of Health-Related Behavior

While some have concluded that the effect of varying payment and coverage mechanisms on health care utilization is well understood, at least "qualitatively" (174), economic models of consumer demand for health services only go part way in explaining health care utilization and outcomes. The departures of health care from conventional economic models have been described (1,90,106), but an alternative model addressing the economics, sociology, and psychology of health and medical care has not been developed (16,94). According to Bloom:

> The problem is that economics is used almost exclusively to explain diverse phenomena and issues without drawing from other fields such as behavioral theory and without integrating unique theories **of the economics of health and medical care [and its interactions]. . .General economic theories can be pushed only so far to explain characteristics of health and medical care (16).**

Similarly, Mechanic has noted that:

> many of the problems in medical sociological research. . . result from a lack of theory about our data and their meaning (94).

The field of health psychology focuses largely on individual differences in the so-called personal health behaviors of individual patients (e.g., exercise, smoking, seat-belt use) and rarely on the financial incentives that may be driving aspects of consumers' and providers' health care behaviors (78,88).

Economic theories of health care utilization focus heavily on the "demand" for services by "consumers," and the overwhelming influence that price has on consumer demand (77). But physicians and other health care providers, as agents of the patient, have an unusual ability to influence demand (34,63,187). Because much of medical care is technical in nature, and because most patients come into contact with the health care system only infrequently and often with considerable uncertainty, there is a severe imbalance of information between patient and provider, including information about the cost of services (16,1 10,173). Taken a step further, all health care providers face uncertainty over the benefits and side-effects of certain medical procedures (12); this uncertainty is almost surely one of the factors in the observed large variations in practice patterns (50,116,1 17,181,182). Other physician-related factors that have been hypothesized to account for variations in numbers and types of procedures and services across populations and geographic areas include differences across States in malpractice laws (potentially affecting the practice of "defensive medicine"). In general, research on how individual physicians allocate health care resources has been minimal (12).

The inadequacy of theory relating economics and health care may also be attributed in part to the nature of health care. According to some observers, explicit discussion of the physician's financial interest in the doctor-patient relationship is "taboo' (47). In addition, given the nature of health care, it is likely that many patients would like to think of their own health and health care as divorced from financial considerations.[9]

Limitations of the Available Analytic Techniques

It is important to keep in mind the limitations of the available data and analytic techniques when considering the literature reviewed for this background paper. Mechanic notes, for example, that "quantitative and qualitative researchers on health issues often have divergent findings and conclusions" (91,94). For example, Mechanic reviewed some of the large-scale multivariate survey research on relationships between potential and realized access indicators conducted by Andersen and his colleagues (91,94). The research by Andersen and his colleagues had found trivial differences in utilization of health services as a function of the ways in which individuals respond to symptoms and the conditions under which they come to view them as abnormal (their "illness behavior' '), in contrast to qualitative studies that

8 Appendix D in this background paper provides an overview of what private health insurance and Medicaid coverage provide.

9 For example, Veatch notes that "It is odd that in medicine, services appear to be authorized without any discussion of prices''(173).

found enormous variability in response to comparable symptoms among patients. Mechanic suggested that large-scale survey research has been limited both conceptually and in terms of the measurement of variables (91,94).

Summary

Having the financial means to gain access to care is one factor affecting individuals' health. For some-perhaps many-Americans, health services have become so costly that a source of third party payment may be the only guarantor of financial access to many forms of health care. Personal examples of how financial problems may impede access, and how health care expenditures can lead to financial ruin, have become common in the popular press (28). However, attempts to explore systematically the breadth and depth of the problem require an understanding of the many factors affecting personal health, the complicated nature of the health care delivery system, and how components of the system respond to numerous and sundry financial incentives. In addition, clear thinking and appropriate research methods that can account for these forces are essential. As attention is drawn to reforming the health care system, support for developing appropriate conceptual models and investigative research tools may increase.

Appendix D

Health Insurance in the United States: Who Is Covered, Who Is Not Covered, and What Coverage Provides

Introduction

Despite the progress made in improving access to health care in the years since 1965 (38,39,40), access continues to be a top-level concern of policymakers, researchers, and lawmakers. In the contemporary United States, gaining access to health services typically depends on individuals' ability to pay for those services. And the receipt of health services can be critical to maintaining and improving health (174). For a variety of reasons, some form of third party payment-either private insurance or public coverage-has come to be seen as necessary to cushion the financial impact of seeking health care services. This appendix presents an overview of sources of insurance coverage in the United States, and the insurance coverage status of the U.S. population. The appendix also discusses briefly the concept of underinsurance among those with some insurance.

Sources of Third Party Payment in the United States

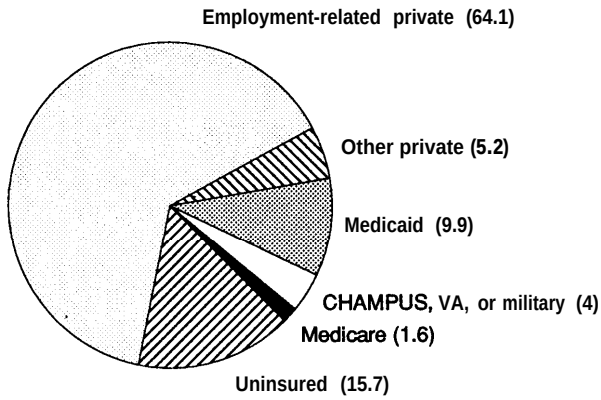
The United States has a mixed public-private system of financing health health (35). Theoretically, coverage for individual health care costs is available to virtually all Americans through one of four major routes: Medicare for the elderly[1] and disabled; Medicaid for low-income women and children (and some men) and those with certain disabilities; employer-subsidized coverage at the workplace; or self-purchased coverage for those ineligible for the previous three. Other sources of third-party payment, affecting far fewer Americans, include group health coverage available through voluntary organizations and the Civilian Health and Medical Program of the Uniformed Services (CHAMPUS) for dependents of active and retired members of the uniformed services. In 1990, an estimated 64 percent of noninstitutionalized U.S. citizens under age 65 had insurance coverage (or health care[2]) from employment-related private plans, 5.2 percent from other private insurance, 9.9 percent from Medicaid, 1.6 percent from Medicare, and 4.0 percent from CHAMPUS, the Department of Veterans Affairs, or the military (figure D-1) (157).

What Does Insurance Coverage Provide?

As a general matter, most Americans who participate in an employment-based group health plan have some coverage for a relatively wide range of hospital and medical services, particularly if the participating employee works for a medium or large employee[3] (168,169, 170) (tables D-1 and D-2). As noted in tables D-1 and D-2, the overwhelming majority of employment-based plans provide some benefits for inpatient and outpatient hospital care, physician-provided care, diagnostic x-ray and laboratory services, prescription drugs, private duty nursing, care in an extended care facility, and mental health, alcohol abuse, and drug abuse treatment. Very little of this coverage, however, is provided "in full," that is, without any limitations or cost-sharing requirements of employees or their dependents (e.g., table D-1; 169,170).

Regulations for the Medicaid program allow for a very generous package of benefits (table D-3). However, States can and do establish strict limits on the frequency and

Figure D-l-Sources of Health Insurance Coverage for Noninstitutionalized Americans Under Age 65,1990 (by percent)



SOURCE: Office of Technology Assessement, 1992, based on March 1991 Current Population Survey, U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-60, No. 175, *Poverty in the United States: 1990* (Washington, DC: U.S. Government Printing Office, 1991).

[1] Medicare and othercoverages for the elderly are not included in this background paper.

2 Respondents to the Us. Department of Commerce, Bureau of the Census's March 1991 Current Population Survey (CPS) are asked 'ot only about coverage by government programs which help pay medical bills, but about those that "provide medical care." The only such programs mentioned specifically by the interviewer are programs of the "VA' (U.S. Department of Veterans Affairs) and the military. Civiliansand current armed forces members are surveyed for the CPS (158)

3 As defined b, the U.S. Department of Labor, Bureau of Labor Statistics, medium and large firms are establishments with 100 workers or mOre in all private nonfarm industries (168). Small firms are defined as those that employ fewer than 100 workers (169).

Table D-l—Percent of Full-Time Participants[a] in Medium and Large Firms[b] by Coverage for Selected Categories of Health Care Benefits, 1989

Category of medical care	Total[a]	Benefit provided					Benefit not provided[c]
		All	Covered in full	Subject to internal limits only[d]	Subject to overall limits only[e]	Subject to internal and overall limits	
Hospital room and board	100%	98%	19%	4%	42%	34%	2%
Hospitalization-miscellaneous services[f]	100	98	19	4	42	34	2
Extended care facility[g]	100	80	7	20	14	40	20
Home health Care[g]	100	75	20	9	17	28	25
Inpatient surgery	100	98	33	1	56	9	2
Outpatient surgery[h]	100	98	38	[i]	51	9	2
Physician visits-in-hospital	100	98	23	1	58	17	2
Physician visits-office	100	97	9	11	71	6	3
Diagnostic x-ray and laboratory	100	98	28	[i]	58	12	2
Prescription drugs-nonhospital	100	95	3	29	60	3	5
Private duty nursing	100	86	16	1	62	8	14
Mental health care	100	97	1	21	1	75	3
In-hospital	100	96	3	20	7	66	4
Outpatient	100	92	1	21	2	68	8
Vision	100	35	5	28	1	2	65
Alcohol abuse treatment	100	97	1	16	19	60	3
Drug abuse treatment	100	96	1	15	20	60	4
Hospice	100	42	9	7	13	13	58

NOTE: Because of rounding, sums of individual items may not equal totals.

[a] It is important to note that: 1) not all full-time employees participate in plans offered by employers, and 2) the U.S. Department of Labor's Bureau of Labor Statistics (BLS) distinguishes among medical care, dental care, and vision care. According to BLS, medical care benefits were provided to 92 percent of employees in medium and large firms, 69 percent of full-time employees in small firms, and 93 percent of full-time employees in State and local governments. Workers are considered participants only if they elected a certain plan. This table applies to cost-containment provisions affecting medical care benefits only.

[b] Medium and large firms are establishments with 100 workers or more in all private nonfarm industries, excluding (in the 1989 survey) firms in Alaska and Hawaii. According to BLS, its survey of these firms provides representative data on 32.4 million full-time employees. Data for the survey were collected by visits of BLS field economists to sampled establishments. Documents describing medical and dental care benefits are collected by BLS and analyzed in Washington, DC.

[c] For all but vision care, percents include employees who elected to waive participation in their employer's medical program but who enrolled in dental and/or vision plans.

[d] Internal limits apply to individual categories of care (e.g., separate limits or benefits for hospitalization). Limits may be set in terms of dollar ceilings on benefits, a requirement that the participant pay a percentage of costs (coinsurance), or a requirement that the participant pay a specific amount (deductible or copayment) before reimbursement begins or services are rendered.

[e] Overall limits are expressed only in terms of total benefits payable under the plan, rather than for individual categories of care. Limits are set as deductibles, coinsurance percentages, and overall dollar limits on plan benefits.

[f] Services provided during a hospital confinement.

[g] Some plans provide this care only to a patient who was previously hospitalized and is recovering without need of the extensive care provided by a general hospital.

[h] Charges incurred in the outpatient department of a hospital and outside of the hospital.

[i] Less than 0.5 percent.

SOURCE: U.S. Department of Labor, Bureau of Labor Statistics, *Employee Benefits in Medium and Large Firms, 7989,* Bulletin 2363 (Washington, DC: U.S. Government Printing Office, June 1990).

number of covered services regardless of whether they are mandatory or optional benefits (154).

Specific services may also be subject to restrictions on coverage (tables D-1, D-2 and D-3). For example, one-quarter or fewer of large-employer-based non-HMO (health maintenance organization) plans in 1989 covered organ transplants (26 percent) well-baby care (22 percent), immunization and inoculation (14 percent), routine physical examinations (14 percent), hearing care (12 percent), or orthoptics (exercises to improve the function of the eye muscles) (3 percent) (table D-2).

With the exception of the National Medical Care Expenditure Survey of 1977 (NMCES) and the National Medical Expenditure Survey of 1987 (NMES), household surveys do not query individuals about the nature of the insurance coverage they have (e.g., services covered, coinsurance provisions, preexisting conditions clauses). The Agency for Health Care Policy and Research in the U.S. Department of Health and Human Service's Public Health Service has not yet analyzed its 1987 NMES data by nature of insurance coverage.

Who Are "The Uninsured"?

Estimates of the number of individuals in the United States who lack health insurance coverage differ. Each March, the U.S. Department of Commerce, through the Bureau of the Census' Current Population Survey (CPS), asks individuals in a sample of U.S. households about their health care coverage, including their health insurance status. However, CPS's March supplements have question wording problems that make it difficult to

Table D-2—Percent of Full-Time Participants[a] by Type of Plan and Coverage for Selected Special Medical Care Benefits[b], by Type of Employer and Type of Plan, 1989 and 1990

Type of employer and benefit item	All plans combined	Type of plan: Health maintenance organization	Type of plan: Non-health maintenance organization
Medium and large firms, 1989			
Hearing care[d]	26%	93%	12%
Orthoptics[e]	3	—[e]	4
Routine physical examinations	28	97	14
Organ transplant	26	23	26
Well-baby care	34	95	22
Immunization and inoculation	28	98	14
Small firms, 1990[f]			
Hearing care[d]	16%	92%	4%
Orthoptics[e]	1	—[k]	1
Routine physical examinations	26	98	15
Organ transplant	28	13	31
Well-baby care	32	97	22
Immunization and inoculation	23	96	12
Preventive dental care[g]	2	9	—[e]
Vision examinations only[h]	12	71	3
State and local governments, 1990[i]			
Hearing care[d]	27%	84%	11%
Orthoptic[j]	1		1
Routine physical examinations	36	97[e]	19
Organ transplant	32	20	36
Well-baby care	39	96	23
Immunization and inoculation	33	95	16
Preventive dental care[k]	2	10	—[e]
Vision examinations only[g]	19	73	4

[a]It is important to note that: 1) not all full-time employees participate in plans offered by employers, and 2) the U.S. Department of Labor's Bureau of Labor Statistics (BLS) distinguishes among medical care, dental care, and vision care. According to BLS, medical care benefits were provided to 92 percent of employees in medium and large firms, 69 percent of full-time employees in small firms, and 93 percent of full-time employees in State and local governments. Workers are considered participants only if they elected a plan.
[b]Plans providing services or payments for services rendered in the hospital or by a physician. Excludes plans that provided only dental vision, or Prescription drug coverage.
[c]Medium and large firms are establishments with 100 workers or more in all private nonfarm industries, excluding (in the 1989 survey) firms in Alaska and Hawaii. According to BLS, its survey of these firms provides representative data on 32.4 million full-time employees.
[d]Plan provides, as a minimum, coverage for hearing examination expenses.
[e]Less than 0.5 percent.
[f]Small firms are defined as those private nonfarm firms with fewer than 100 workers. According to BLS, its survey of these firms provided representative data on 40.8 million full-and part-time employees. Data shown in this table are for full-time employees only. According to BLS, insurance benefits-sickness and accident insurance, long-term disability insurance, medical care, dental care, and life insurance-were available to one-tenth or fewer part-time workers. No further details were provided on benefits available to part-time workers in BLS's report.
[g]Includes plans that only provide examinations and x-rays.
[h]Includes plans that provide only examinations.
[i]According to BLS, these data represent about 13 million full-time employees in all State and local governments in the 50 States and the District Of Columbia. Detailed data for 1.6 million part-time employees were not provided.
[j]Exercises to improve the function of the eye muscles.
[k]Where applicable, dash indicates no employees in this Category.

SOURCES: Medium and large firms: U.S. Department of Labor, Bureau of Labor Statistics, *Employee Benefits in Medium and Large Firms, 1989,* Bulletin 2363 (Washington, DC: Government Printing Office, June 1990); Small firms: U.S. Department of Labor, Bureau of Labor Statistics, *Employee Benefits in Small Private Establishments, 7990,* Bulletin 2388 (Washington, DC: Government Printing Office, June 1990); State and local governments: U.S. Department of Labor, Bureau of Labor Statistics, *Employee Benefits in State and Local Governments,* 1990 (Washington, DC: U.S. Government Printing Office, 1991).

estimate the number of insured vs. uninsured individuals. The CPS question is, ". . during [year], was anyone in this household covered by a health insurance plan?" Theoretically, if respondents answer without recall error, respondents who report not being covered by either private or public sources should have been uninsured for the entire year (84). But for a variety of reasons, CPS estimates are believed to overestimate the number of people who are uninsured for an entire year, and underestimate the number of people who are uninsured ***at any particular point in time &r&g the year (84,133).***

According to the CPS, 34.4 million nonelderly U.S. citizens, equivalent to 15.7 percent of noninstitutionalized Americans under age 65, were estimated to lack health insurance during 1990 (157).

In support of estimates from the CPS, but providing additional estimates of the number of individuals who

Table D-3—Mandatory and Optional Services Covered Under Medicaid

Mandatory services
- Inpatient hospital services
- Outpatient hospital services
- Physician's services
- Early and Periodic Screening, Diagnosis, and Treatment (EPSDT) services for individuals under age 21
- Diagnostic and treatment services for renditions uncovered during the course of an EPSDT screen
- Under EPSDT, periodic medical and dental screenings, including health education and anticipatory guidance
- Family planning services and supplies
- Laboratory and x-ray procedures
- Skilled nursing facility and home health care services for individuals age 21 and older
- Rural health clinic services
- Services of certified nurse-midwives, pediatric and family nurse practitioners even if practicing independently[a]
- Community health centers, migrant health centers, and health care for the homeless programs receiving funds under sections 329, 330, or 340 of the Public Health Service Act

Optional services
- Case management
- Additional home health services
- Dental services
- Services of other licensed practitioners, including psychologists, chiropractors, optometrists, and podiatrists
- Clinic services
- Other diagnostic, screening, preventive, and rehabilitative services
- Prescription drugs
- Intermediate care facility services, including intermediate care facility services for the mentally retarded
- Home and community-based services for mentally retarded individuals
- Eyeglasses, prosthetic devices, dentures, and orthopedic shoes
- Home and skilled nursing facility care for children
- Private duty nursing
- Inpatient psychiatric care for individuals under age 21
- Physical, occupational, and speech, hearing, and language disorder therapies
- Home care for elderly who would otherwise be institutionalized
- Other medical or remedial care recognized under State law, including personal care in the home, transportation, and emergency services, skilled nursing facilities for individuals under age 21, Christian Science nurses and sanitariums, hospice care services, respiratory care services

[a]To the extent that they are authorized to practice under State law.

SOURCES: U.S. Congress, Office of Technology Assessment, *Evaluation of the Oregon Medicaid Proposal, 1992,* based on provisions of Omnibus Budget Reconciliation Act of 1989 and Omnibus Budget Reconciliation Act of 1990; U.S. Department of Health and Human Services, Health Care Financing Administration, Division of Intergovernmental Affairs, *Medicaid Services State by State,* HCFA Pub. No. 02155-92 (Washington, DC: U.S. Government Printing Office, October 1991).

may be uninsured, the U.S. Department of Health and Human Service's NMES found that approximately 48 million Americans, or 20 percent of the population under age 65, lacked health insurance for all or part of 1987, with between 34 and 36 million uninsured on any given day and 24.5 million uninsured throughout the year (123,125).

Why Do Individuals Lack Health Insurance?

It is often overlooked that, with some exceptions, such as Medicare hospital coverage (Medicare Part A), health insurance in the United States is:

> a private, voluntary matter. . .The demand for insurance, like the demand for any product or service, depends on consumers' ***ability and willingness*** **to pay for it (56).**

Fuchs points out that what is typically known as "employer-provided' health insurance is a misnomer:

> Employers do not bear the cost of health insurance; workers do, in the form of lower wages or forgone nonhealth benefits (56).

Individual patients, then, do have a role as consumers in the purchase of health insurance, even if it is "provided' by employers.

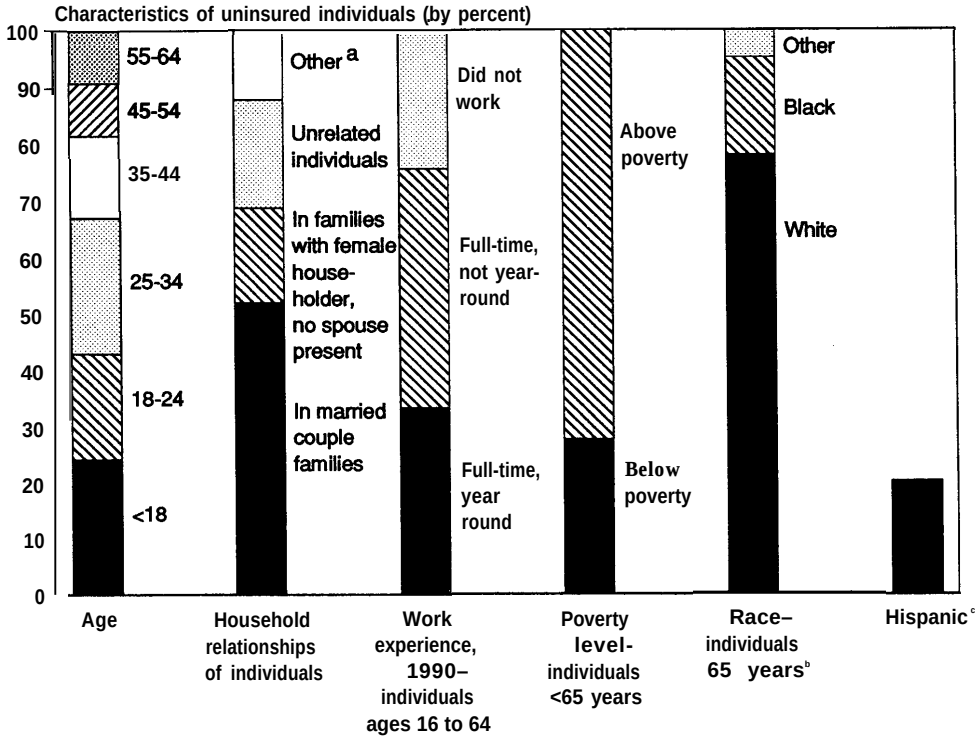
It is unclear how much income an individual or family should be expected to devote to purchasing health insurance coverage as opposed to other goods and services, but most analyses seem to suggest that many individuals appear to lack insurance because they cannot afford it rather than because they are unwilling to buy it (45,84,142,157,159). Some data are available to compare the health status of uninsured individuals with insured persons, but there is little information that identifies those individuals who are either insured or uninsured ***because they are*** sick or disabled. Demographic and health status characteristics of the uninsured population are discussed below.

Demographic Characteristics of Uninsured People

As suggested in figure D-2a **and D-2b,** uninsured people comprise a heterogeneous group. Individuals of any age, work experience, poverty level, race, ethnicity, years of education, in any household configuration, of either gender, and living in any type of residential area (e.g., urban vs. rural) or region can lack health insurance. For example, in 1990, more than half of uninsured individuals lived in married couple families; almost one-third of uninsured individuals of working age worked full-time, year-round; more than two-thirds of uninsured individuals lived in families with incomes above the Federal poverty level; almost 30 percent were college-educated; and almost 80 percent were white (figure D-2a and D-2b).

Some attributes are, however, more likely to be found in uninsured people than among insured individuals. These attributes include: employment in a small firm; self-employment; residence in a nonrnetropolitan area; living on one's own without children; living in a single-parent family with children; being of Hispanic

Figure D-2a—Uninsured Individuals' Ages, Poverty Levels, Work Experience, Family Living Situation, Race, Ethnicit y, Gender, Years of Education, Residence, and Region



[a] Includes persons living in unrelated subfamilies and in other types of families (e.g., in families with male householder, no spouse present).
[b] Includes individuals of Hispanic origin.
[c] Persons of Hispanic origin can be of any race.

SOURCES: Data on age, poverty level, work experience, household relationships, race, and gender: U.S. Department of Commerce, Bureau of the Census, *Poverty in the United States: 1990*, Current Population Reports, Series P-60, No. 175 (Washington, DC: U.S. Government Printing Office, 1991). Data on education, region, and residence: U.S. Department of Commerce, Bureau of the Census, unpublished 1990 data on health care coverage, from the March 1991 Current Population Survey, November 1991.

origin; having no more than a high school education; being male; and being a young adult ages 21 to 24 (142,157). Some, but not all, of these factors have been found to be correlated with income levels, and, in a multivariate analysis of 1987 U.S. Bureau of the Census CPS data for OTA, Kronick found family **income was the** most important determinant of health insurance status for all age groups under age 65 (84).[4] More recent data from the CPS suggest that almost 30 percent of individuals in families with incomes below the Federal poverty level[5] lacked both private and public coverage during 1990 (157). The Federal poverty level was $13,359 for a family of four in 1990 (157).[6] Similarly, among employed people, as worker earnings decrease, the likelihood of being uninsured increases (45).

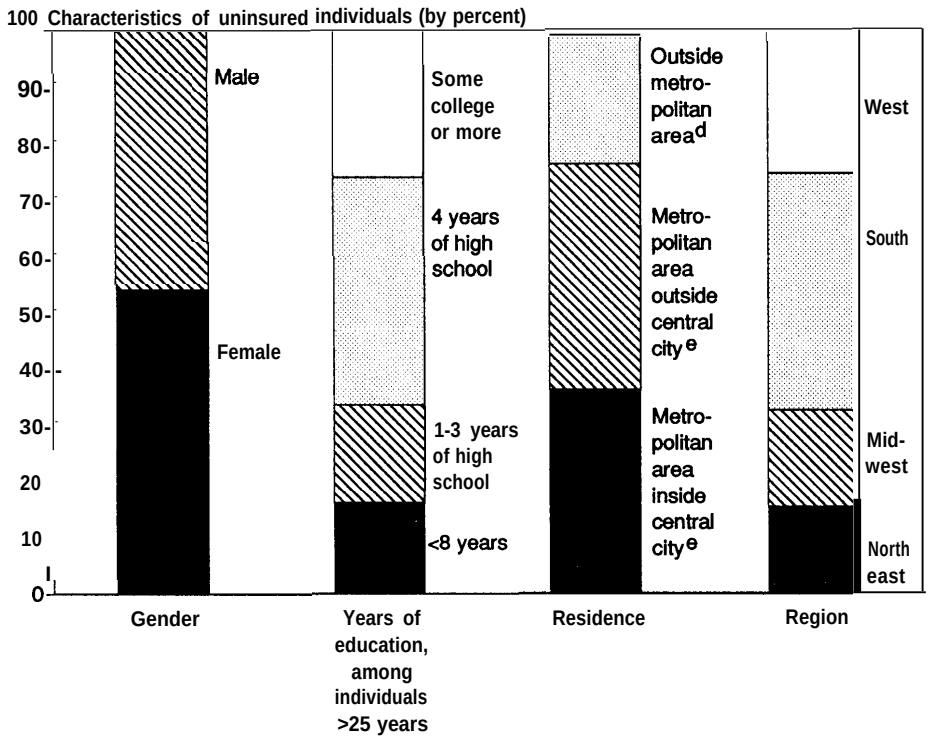
As points of comparison with these income figures, the U.S. Department of Labor, Bureau of Labor Statistics,

4 Oth, factors examined in Kronick's multivariate analysis, which focused on the health insurance status of adolescents ages 10 to 18, included race and ethnicity, region, residence (e.g., central city, other metropolitan statistical area), gender, parents' work status, size of parents' employer, industry of parents' employer, parents' education, and parents' marital status (84). Although Kronick's analysis focused on the health insurance status of adolescents, he found that, to a large extent, the insurance status of an adolescent depends on the insurance status of his or her parent(s) (84).

5 The Federal poverty level was originally calculated to be about 3 times the cost of food included in the "economy food p@" the least costly Of four nutritionally adequate food plans designed by the U.S. Department of Agriculture in 1955. Some changes have occurred since 195in the ways that poverty thresholds are defined, and currently the poverty thresholds rise each year by the same percentage as the annual average Consumer Price Index. Poverty thresholds also depend on family size, the number of related children under 18 living in the family unit, and, to some extent, the age of the householders (157). Definitions of poverty have been the focus of numerous hearings and reports (98,139).

6 NMES found that, in 1987,65 percent of uninsured individuals were in families with incomes below 200 percent of the Federal poverty level annually (123).

Figure D-2b—Uninsured Individuals' Ages, Poverty Levels, Work Experience, Family Living Situation, Race, Ethnicit y, Gender, Years of Education, Residence, and Region



dThe U.S. Department of Commerce, Bureau of the Census, uses the U.S. Executive office of the President, office of Management and Budget's June 1984 definition of *metropolitan areas.* Metropolitan areas are also known as metropolitan statistical areas (MSA). An MSA is a geographic area consisting of a large population nucleus, together with adjacent communities which have a high degree of economic and social integration with that nucleus. An area qualifies for recognition as an MSA if: 1) it includes a city of at least 50,000 population, or 2) it includes a Census Bureau-defined urbanized area of at least 50,000 with a total metropolitan population of at least 100,000 (75,000 in New England). In addition to the county containing the main city or urbanized area, an MSA may include other counties having strong commuting ties to the central county. The territory outside metropolitan statistical areas is referred to as *nonmetropolitan.*

eCentral cities *are* defined in two different ways by the U.S. Department of Commerce, Bureau of the Census. The largest city in each metropolitan statistical area (MSA) (also called metropolitan area) is designated as a central city. There may be additional central cities if specified requirements, designed to identify places of central character within the MSA, are met.

SOURCES: Data on age, poverty level, work experience, household relationships, race, and gender: U.S. Department of Commerce, Bureau of the Census, *Poverty in the United States: 7990,* Current Population Reports, Series P-60, No. 175 (Washington, DC: U.S. Government Printing Office, 1991). Data on education, region, and residence: U.S. Department of Commerce, Bureau of the Census, unpublished 1990 data on health care coverage, from the March 1991 Current Population Survey, November 1991.

calculated that in the employment situations that required employee contributions in 1989, the average annual full-time employee contribution to the premium for employer-subsidized large group health insurance in medium and large firms was $303.72 for individual coverage and $865.20 for family coverage[7] (168).[8] Average annual out-of-pocket costs for health care, not including premiums, are not available for 1990, but in 1987, they averaged $361 per user of health services aged less than 65, ranging from $708 for the average user who was covered by private insurance and in fair to poor health, to $166 for the average user covered by public

7 If the amount of contribution varied by either size or composition of the family, the rate for an employee with a spouse and one child wss used by BLS.

8 Requirements for employee contributions differed according to whether only the employee, or theemployee and his or her family, was covered, whether the plan was an HMO or not, and the employee's type of job (professional and administrative vs. technical and clerical vs. production and service) (168). Across all job types, 59 percent of employers required employee participation inpremiumpayments for an HMO plan covering a single employee, and 73 percent if the HMO plan covered the employee and his or her family (168). In non-HMO plans, the figures were 45 percent and 64 percent, respectively. The number of employers requiring employees to pay a part of the premium price is believed to have increased since 1989.

insurance and in good to excellent health, according to the NMES *(85).* It maybe important to note that: 1) these are average expenditures, not ranges of actual expenditures, and 2) the averages pertain to individual users of health care services. An entire family's health expenditures may be paid for out of the wages of a single earner. One source estimates that the ***approximate average annual yearly cost*** to an insured Federal Government employee and his or her family of four under the Federal Employees Health Benefit Plan can range from $1,500 (if enrolled in a Washington, DC, area HMO) to $6,110 (if enrolled in a high option fee-for-service plan) (51). This estimate includes the cost to the employee of the premium share,[9] dues if applicable,[10] and unreimbursed health care bills, for a ***typical mix*** of hospital, medical, drug, and dental bills. [11] Insurance premiums and health care expenditures are not calibrated to family income.

According to the NMES, the average family paid approximately half of its medical expenses out-of-pocket in the year 1987 (85). At the lower end of the range, the average near-poor family (families with incomes between the Federal poverty line and 125 percent of the poverty line) with public insurance paid 12.5 percent of its medical expenses out of pocket; at the higher end of the scale, low-income families (families with incomes between 125 and 200 percent of the Federal poverty line) with private insurance paid, on average, 55 percent of their medical expenses directly out of pocket.[12]

Health Status of Uninsured Individuals

The majority of individuals in the United States are covered by some form of insurance (see above), and are in good health (10,85,165).[13] As has been well documented, however, there is a relatively small proportion of Americans with serious chronic health problems, and another small proportion every year with short-lived, but serious, acute health problems. On average, 13 percent of U.S. citizens under age 65 reported their health to have been fair or poor in a national survey conducted in 1987 **(85). Almost 4 percent of 15 to 44 year olds and 8 percent of 45 to 64 year olds reported in 1989 that they are limited in the amount or kind of their major activity (e.g., work) as a result of a chronic condition (165). Thirty-two percent of Americans ages 18 to 64 have been found to have experienced a mental disorder at some point during their lifetime, and the annual prevalence of disease is 20 percent (115). What is difficult to sort out is how these varied health problems affect individuals' ability to gain insurance coverage, and how difficulties obtaining insurance coverage affect access and health status.**

The annual CPS does not collect data on respondents' health status when it collects information on health insurance status, but several other national surveys have collected both kinds of data simultaneously. Age (99), income (140), and perhaps other adjustments (120) are clearly appropriate for comparisons of health status by insurance coverage, yet they have not always been made.

The evidence on health status by insurance status suggests that, even without adjustments for income, ***uninsured persons are*** considerably more likely than ***privately insured*** individuals to report being in fair to poor health (figure D-3). However, it is noteworthy that individuals who report being covered by public sources (e.g., Medicaid) are more likely to report being in fair or poor health than either uninsured or privately insured persons (figure D-3). Studies that examine the health status of individuals with both public and private coverage show, as expected, a level of perceived health somewhere between those covered by Medicaid and those with private insurance (figure D-3).[14]

The findings for Medicaid can probably be at least partially accounted for by categorical eligibility for people with disabilities, but it may also be related to the fact that eligibility for Medicaid always involves being sufficiently poor to meet eligibility resource limits.[15]

In fiscal year 1990, blind and disabled persons with low incomes comprised approximately 15 percent of the

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9 The Federal Government pays a substantial amount-up to 75 percent for most employees-toward the premium cost of the plan chosen by an employee. Nationally, about 400 plan options participate, and between one and two dozen are available in each locality (5 1).

10 Dues are required to enroll in some of the Federal employees' plans.

11 For the same family size with bills near $50,000 (the upper limit examined by this source), the approximate yearly cost would be no higher than $9,550 with dental bills included, and $7,410 with dental bills not included (because most stop-loss provisions do not include dental care) (51). No plan includes mental health or nursing home expenses in its stop-loss guarantee.

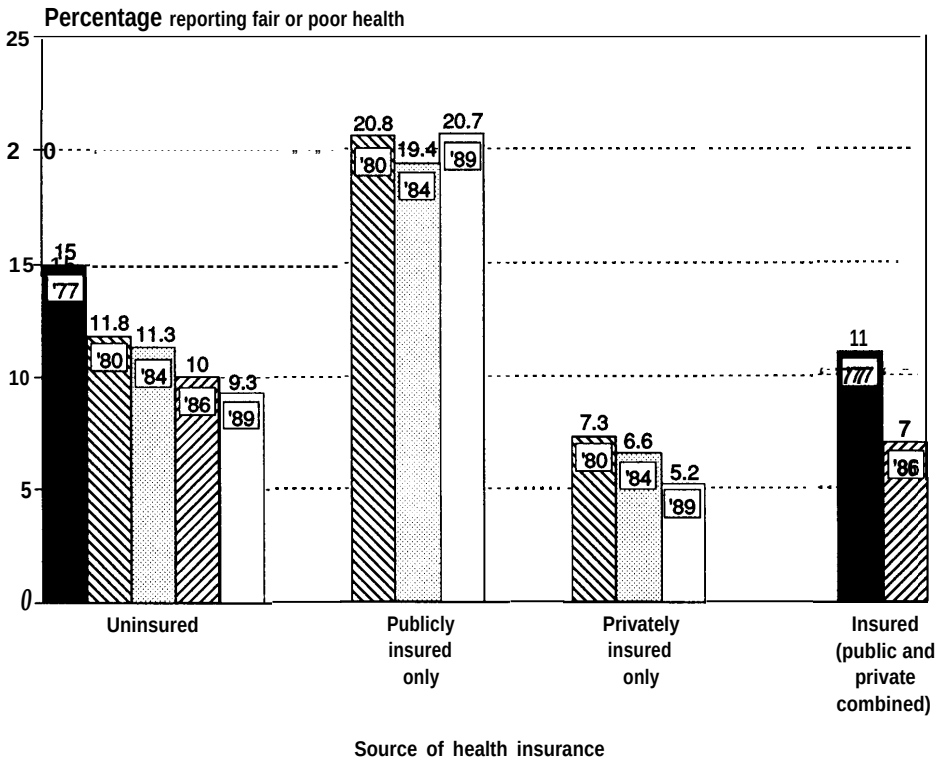
12 The average range of proportions of out-of-pocket medical expenditures was from. 175 for the publicly insured in "excellent to good" heal@ to .798 for the uninsured in "excellent to good health" (85).

13 Being in good health does not mean, however, that individuals may not require some level of health services. For example, 19 to 24 year olds, who are least likely to be insured, are also at highest risk of serious accidental trauma (e.g., that caused ina car crash) (165). More common examples of health services used by people who are healthy overall include preventive services such as immunizations, prenatal care, dental care, and screening for cancer detection; services for acute problems such as upper respiratory infections, ear infections, and crises affecting mentahealth; and services for chronic, but not necessarily serious, problems such as minor vision impairments.

14 Perceived health status (e.g., a response t. some variant of the question, "Would you say your health is excellent, very good, good, fair, or poor?") has been found to be a relatively good indicator of individual health status, especially in terms of predicting male mortality (74).

15 Persons are eligible for Medicaid if they are in families with dependent children, are pregnant women, or are adults who are blind, disabled, or 65 years of age or over; and if they are sufficiently poor to meet eligibility resource limits (174).

Figure D-3-Percentage of Population Under Age 65, All Incomes Combined, Reporting Fair and Poor Health Status, by Insurance Coverage, Various Studies, Various Years, Unadjusted Data



[a]Year data collected.

SOURCE: 1977: K. Davis and D. Rowland, "Uninsured and Underserved: Inequities in Health Care in the United States," *Milbank Memorial Funk Quarterly* 61(2):149-176, *1983. 1980:* U.S. Department of Health and Human Services, Health Care Financing Administration, "Access to Medical Care in 1980," *National Medical Care Utilization and Expenditure Survey, Series* B, Descriptive Report No. 12, prepared by E.S. Leicher, E.M. Howell, L. Corder, et al. (Baltimore, MD: HCFA, 1985). 1984: D. Rowland and B. Lyons, "Triple Jeopardy: Rural, Poor, and Uninsured," *Health* Services Research 23(6):975-1004, 1989. 1986: U.S. Congress, Library of Congress, Congressional Research Service, *Health Insurance and the Uninsured: Background Data and Analysis* (Washington, DC: U.S. Government Printing Office, June 1988). 1989: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Center for Health Statistics, unpublished data from the National Health Interview Survey on the percent of persons assessed by respondents to be in fairorpoorhealth by age and health care coverage status, United States, 1989, Hyattsville, MD, April 6, 1992.

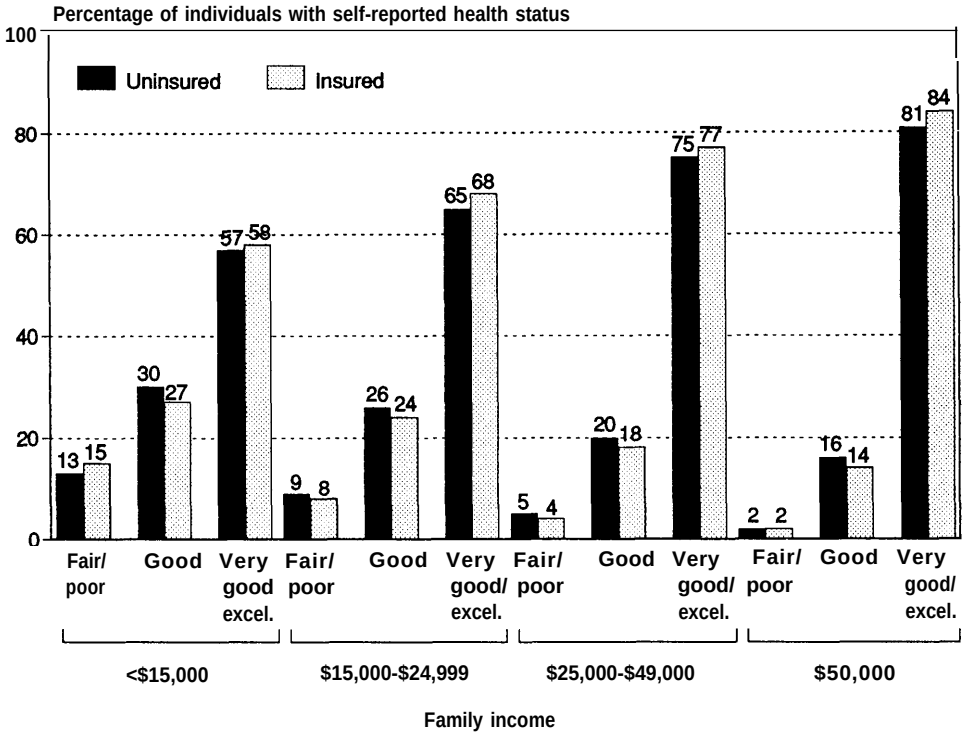
estimated 25.3 million Medicaid recipients; another 13 percent of Medicaid beneficiaries in 1990 were age 65 or older (161). Forty-four percent of the estimated 25.3 million Medicaid recipients in 1990 were children under 21, most of whom qualified under provisions related to low-income families with dependent children (161). The extent of the health care needs of these blind, disabled, and aged individuals is suggested by the fact that these enrollees accounted for 71 percent of all Medicaid payments in 1990 (161).

As shown in figure D-4, ***insured*** individuals in families with the lowest incomes (below $15,000 in 1986), and therefore more likely to be covered by Medicaid, were more likely than uninsured individuals (public and private combined) to report their health as fair or poor (140). Conversely, insured individuals in every family income group were slightly more likely than uninsured individuals to perceive themselves as being in very good to excellent health (figure D4;140). Although the causal relationships are poorly understood, lower socioeconomic status has been found to be predictive of higher-than-expected infant mortality, developmental problems, morbidity,psychological distress, and mortality (24,59,93,188).

Health Status as a Reason for Refusal of Coverage

Because most individuals purchase insurance coverage as part of employer-based group health plans, they

Figure D-4-Reported Health Status by Family Income and Health Insurance Status, 1986



SOURCE: U.S. Congress, Library of Congress, Congressional Research Services, *Health Insurance and the Uninsured: Background Data* andAnalysis(Washington, DC: U.S. Government Printing Office, June 1966), based on 1986 NHIS public use tapes.

typically are neither refused coverage outright, nor refused coverage for so-called preexisting conditions.[16] Premiums for group policies are usually experience-rated[17] and adjusted annually on the basis of the actual claims experience of the group in the previous year. Groups that incur higher than average medical expenditures are charged a proportionately higher rate, but the cost is distributed equally among all group members, minimizing the burden for any one individual. By contrast, people without access to group coverage have difficulty in obtaining health insurance at comparable premiums (10). Individuals in small group plans (e.g., small employers), where there are fewer individuals to share the cost of premiums, may also have difficulty obtaining health insurance at premiums comparable to those of large groups, especially if one or more employees develop a serious chronic health problem (75,76).

As part of the 1987 NMES, a small sample of individuals who reported being uninsured were asked whether they had ever investigated the cost of obtaining private health insurance, and, if so, whether they had ever been denied private health insurance or offered limited coverage because of their health. Based on findings from the NMES survey, Beauregard estimated that, in 1987, about 889,000 uninsured persons under age 65 (2.5 percent of the total uninsured population in this age group) had been denied private health insurance or offered limited coverage because of their health (10). The presence of chronic conditions or other serious health problems or functional limitations increased the likelihood of wanting to purchase, and of being denied, private health insurance, as did having received treatment for a wide range of serious medical problems known to be closely associated with declining social or physical functioning (i.e., life-threatening, degenerative, or chronic conditions) (10). For example, coverage denial rates for persons with hypertension and arthritis or rheumatism, while low at 6.5 percent, still exceeded those for the

16 As defined by insurers, a *preexisting condition* is a condition existing before an insurance policy goes into effect and commonly defined as One which would cause an ordinarily prudent person to seek diagnosis, care, or treatment.

17 Experience rating is a method of adjusting health plan premiums based on the historical utilizationand distinguishingcharacteristics of a specific subscriber group.

uninsured population in general. However, Beauregard notes that these numbers should be interpreted as lower bound estimates of the extent to which preexisting conditions limit access to health insurance. She notes that:

> only persons who lacked private coverage at the time of the round 1 household interview were asked if they had ever been denied health insurance or limited in the type of insurance they could obtain because of their health [and] NMES household data do not permit estimates of the number of privately insured whose policies excluded preexisting conditions (10).

Later investigations by the NMES will include analyses of the features of actual insurance policies held by a sample of respondents to the household portion of the study. It should be noted that the NMES results apply to 1987. Anecdotal evidence suggests that the use of preexisting conditions to deny coverage has become more prevalent since that time (32).

The Underinsured

Defining and counting individuals who are ***underinsured,*** or those without sufficient insurance coverage, is even more complicated than counting those who are completely uninsured, because, as implied above, whether an individual is underinsured can depend on a patient's diagnosis, where the patient receives care, the duration of the episode of illness, what types of treatment are required, and whether there is a dollar or time limit to coverage (55). One 1985 estimate, based on 1977 data and a definition of underinsurance as being "inadequately protected against the possibility of large medical bills," put the number of underinsured at 56 million people, or **26 percent of the nonelderly population (48).** To this population of 56 million who may be inadequately protected because of shortcomings in coverage could be added those whose insurance precludes coverage of specific conditions or imposes a waiting period before such coverage becomes operative;[18] individuals who are covered by Medicaid but who lack access to health care because of health care providers' reluctance to treat Medicaid clients; and others (32,55).

Summary

The American system of financing health care is a patchwork. Most Americans have some coverage for health care expenses through their employer, or through the employment of a family member. Americans who are not covered through an employment-based insurance plan are covered by Medicaid or Medicare. Perhaps 35 million Americans lack any health insurance coverage at all. To label these people "the uninsured" suggests that Americans who lack insurance are a homogeneous group. In reality, they are quite heterogeneous in demographic characteristics and in health status. Although uninsured individuals are overrepresented in certain demographic groups, uninsured individuals in the United, States are represented in the same age, gender, racial and ethnic, income, employment, regional, and health status groupings as are insured individuals. Finally, complete lack of health insurance is not the only potential financial barrier to access. An unknown number of Americans may be underinsured in that particular medical conditions or costly services are not covered, or they are otherwise susceptible to large medical bills.

18 According to the U.S. Department of Labor, Bureau of Labor Statistics' 1989 survey of employers, 49 percent of medium and large firms imposed a length-of-service requirement before participation in a health benefits plan could commence (168). The most frequent length-of-service requirement was 3 months, a requirement characterizing 17 percent of medium and large firms combined. Firms were more likely to impose a length-of-service requirement for production and service employees (58 percent of firms) than for technical and clerical employees (45 percent of firms) or professional and administrative employees (38 percent of firms). BLS no longer examines policies for clauses concerning preexisting conditions. BLS found that fee-for-service plans were consistent in the types of preexisting condition clauses that they used, and HMOS are not allowed to exclude coverage of preexisting conditions (67). In the fee-for-service plans surveyed by BLS prior to its 1989 and 1990 surveys, if an employee had been treated for a condition before joining the plan but went 90 days without treatment, he or she would be covered; if the employee had been treated within the 90 days prior to enrolling in the plan, then he or she would have to wait a year before becoming eligible for coverage of services specific to the preexisting condition (67). There is no systematic source of information about current use of preexisting condition clauses in employment-based group plans.

Appendix E

Additional Information on the Nature of OTA's Review and Methodological Characteristics of Studies Reviewed

Additional Information on the Nature of OTA's Review

Literature Search. An initial literature search was performed by OTA's contractors using a combination of techniques that included using computerized searches and tables of contents services from Boston-area universities; scanning the bibliographies of articles; collecting reports generated from major health care utilization surveys published by the Federal Government and other sources; and polling experts in the field. The principal computerized search was performed using Paperchase, a system that tracks all health and medical care publications included in both the Medline database and in the entire Health Planning and Administration database. Epstein and Weissman included all English-language articles published since 1980. The keywords uninsured, medical indigency, Medicaid, uncompensated care, managed care, deductibles and coinsurance were "crossed" with delivery of health services, health care rationing, personal health services, hospitalization, length of stay, quality of health care, consumer satisfaction, health services accessibility, hospital use, pharmaceutical use, primary care, preventive, process and outcomes of care, and several others to produce a list of approximately 1,200 references that were scanned by the contractors for inclusion in the review. A supplementary search was performed using a similar strategy by the Group Health Association of America's Library Reference Service (178).

Study Selection. OTA focused its review on studies that have statistically adjusted, or otherwise attempted to correct, for competing alternative explanations for results.

Synthesis and Presentation of Study Findings. Study findings were analyzed, and are presented, in two ways. First, findings of all multivariate studies reviewed by OTA are roughly summarized as to their findings regarding the relationships among insurance coverage and utilization, process, and health outcomes of health care, for relevant comparison groups, on the indicators specified. This type of analysis is sometimes termed a "box score" synthesis. Second, OTA examined the magnitude of the relationships between insurance coverage status and utilization, process, and health outcomes.

"Box score" study findings are coded in terms of whether they support the overall hypothesis that those individuals with no or with "poorer' insurance coverage (e.g., Medicaid coverage) fare potentially worse than those with private insurance coverage. In the initial presentation of study results, a "+" indicates that uninsured (or poorly covered) individuals were in fact found to fare potentially worse[1] than the comparison group on the measure specified (e.g., number of physician visits, use of preventive care, greater intensity of resource use, higher rate of in-hospital death, episodes of inpatient care). A "-" indicates that the study found that, contrary to expectations, individuals without insurance, or with relatively poor insurance coverage, had a potentially better outcome than those with relatively better insurance coverage. A "O" indicates that the study found no significant differences between comparison groups. An "M" indicates that study results were mixed. The notation "n.a." indicates that the study did not examine the outcome specified for a particular comparison (e.g., uninsured vs. privately insured individuals).

For purposes of public or private policymaking, it may be important to consider not just whether insurance coverage makes a statistically significant difference in access, process, and outcomes but the magnitude of, and variation in, relationships. Information about, the magnitude of differences can help to predict, all other things being equal, changes in the use of health care services and even in health status should those who are currently uninsured become covered. Alternatively, if the impact of insurance on these factors is insubstantial, some would argue that a major disruption in the health care system solely for the purposes of expanding health insurance is unwarranted.

Although important, judging magnitude and variation is a very difficult thing to do because of the wide variety of study methods used and because of the methodological flaws characteristic of this field of research.[3] Of necessity, research in this field has used different indicators of utilization, process and outcome; considered varying patient conditions; used different measures of baseline health status; and used data from different periods of time, geographical areas, and provider types; employed differ-

[1] OTA uses the phrase "potentially worse" for two reasons: 1) the study findings must be regarded as somewhat tentative; and 2) in some cases it is not clear whether the endpoint measure is in fact a "worse" outcome for the more poorly insured (e.g., greater use of certain procedures).

[2] Statistical significance is a judgment, based on commonly agreed to statistical principles, that there is relatively little likelihood (typically from below 1 to below 5 percent) that an observed relationship between or among the variables examined in the analysis has occurred by chance.

[3] A general discussion of methodological issues in this field is included in appendix C, "Conceptual Framework," of this background paper. Metrological flaws common to many of the studies include incomplete data sources and no commonly accepted way to measure baseline health status.

ent methods of data analysis; and presented study results in different ways (see table E-l). In some ways, these variations across studies can be considered an overall strength. Greater confidence can be placed in study results that are roughly consistent across time, place, patient income, race, gender, and medical condition. However, studies applied adjustments for these factors inconsistently (tables E-2 and E-3). Short of a very time-consuming and costly secondary analysis of the data sets on which these analyses were performed, it is impossible to construct a completely valid way to synthesize quantitatively the results of the studies on a common scale. Further, even a reanalysis of past research aimed toward constructing a common scale to measure the results may not answer today's most important policy-related questions.

As an interim step, in estimating magnitude and variation, OTA manipulated published data in order to present study findings in terms of a ratio. For example, figure 5, shown earlier in this background paper, presents the ratio of uninsured individuals to privately insured individuals lacking a usual source of care, as reported in particular studies. If a study did not initially present its quantitative findings in terms of a ratio, the findings were converted to a ratio when possible. In some cases when OTA was not able to discern needed information from data published in the studies, OTA contacted the authors of the study and obtained data usable in OTA's analytic approach. Not every analysis in every study was converted to a ratio.

Because of recent theoretical and methodological advances in health services research, and to ensure that study findings are more relevant to the current situation in terms of potential access, OTA limited its examination of the magnitude of relationships among insurance coverage and utilization, process, and health outcomes to those studies using data collected in 1980 or more recently.

Table E-l—Methodological Features of Studies Examining Relationships Between Insurance Coverages, Utilization, Process, or Outcomes of Health Care

Study author(s) and year of publication	u, P or O[a]	Year and source of study data	Indicator	Condition or procedure	Number of cases and study population	Insurance status comparison(s)
* Aday and Andersen, 1984	u	1982, national telephone survey	Percent reporting that they needed help but did not get it	All	6,610 adults and children	Private; public; no insurance
Becker and Sloan, 1983	P	1974, case abstracts of hospital discharges (CPHA);AHA survey data; county-level area characteristics	Mean LOS; mean tests, cultures, consultations, functions per patient	All	397 hospitals	Private=BC and commercial, other; Medicaid; self-pay
Billings and Teicholz, 1990	o	1988, DC hospitals	Percent avoidable/preventable hospitalizations	All except trauma and obstetrics	955 patients	Insured vs. Medicaid vs. not insured or self-pay
• Braveman et al., 1989a	0	1982-86, 8 CA counties	Prolonged hospital stay, or transfer to another hospital or long-term care facility, or death, LBW	Births	118,123 patients	Private insurance vs. none
* Braveman et al., 1991	P	1987, CA civilian acute care hospitals	LOS; total charges excluding physicians' fee; charges per day		29,751 newborns discharged with evidence of serious problems	Private insurance vs. Medicaid vs. uninsured ("self-pay" or indigent)
• Burstin et al., 1991	P	1984, nonfederal, acute care, NY hospitals	Negligent adverse events	All except psychiatric	31,429 records	Private insurance, Medicaid, Medicare,[b] uninsured, and other
.Chen and Lyttle, 1987	u, P	1982, RWJF National Access Survey	Hospital admission vs. not; mean (logged) hospital days; saw physician vs. not; mean visits for those who saw a physician; receipt of various preventive services; satisfaction with most recent visit	Any	3,000 families, including 1,800 low-income families	Private only; public and private; none
* Cornelius, 1991		1978-81, CHAS evaluation of RWJF CHP	Hospital admission		1,150 individuals 65 with an episode of illness and a condition causing them the most worry, or who had 3 or more disability days	Any private; public (Medicare, Medicaid, County Aid); uninsured

NOTE: *=study is included in graphs with estimates of magnitude and variation.
[a]Study was used in this review to examine the relationships among insurance status and utilization (U), process (P), and/or health outcome (O).
[b]The impact of Medicare coverage is not discussed in this background paper.

Continued on next page

Table E-l—Methodological Features of Studies Examining Relationships Between Insurance Coverages, Utilization, Process, or Outcomes of Health Care-Continued

Study author(s) and year of publication	u, P or O*	Year and source of study data	Indicator	Condition or procedure	Number of cases and study population	Insurance status comparison(s)
Dowd et al., 1986	P	1982, UHDDS for community hospitals in St. Paul and Minneapolis	Percent above or below mean LOS for commercially insured patients	7 DRGS (e.g., delivery, hysterectomy, stomach disorder, back problems, psychoses)	51,786 cases among Twin Cities residents	Private=prepaid group, I PA, BC, commercial; public= Medicaid, Medicare; other insurance=workers' compensation; uninsured= self-pay, no charge or charity
Duncan and Kilpatrick, 1987	P	1984, 130 FL hospitals	ALOS	Not specified	14,563 patients likely to incur uncompensated charges (e.g., uninsured or unemployed or high cost hospital stays)	No coverage vs. some coverage
•Epstein et al., 1990	P	1987, interviews with patients admitted to 5 MA hospitals	ALOS	All except obstetric and psychiatric	16,908 adult patients	Medicaid vs. "Other' insurance"
Freeman et al., 1987	U	1986, RWJF national access telephone survey	Percent of those with 1 or more physician visits in year with serious symptoms who did not see or contact a physician	All	10,103 total sample	Uninsured vs. all other
Friedman et al., 1973		1970, MA tumor registry and hospital reimbursement data	Stage at diagnosis: localized vs. regional vs. distant	Breast cancer	202 patients	Private (excluding BC/BS) vs. Medicaid and uninsured combined
Goldfarb etal., 1983	P	1970, sample survey of medical and financial records, New England hospitals	LOS, "real" ancillary services	5 narrowly defined common medical and surgical procedures	63 hospitals	BC/BS, commercial, VWlfare, self-payment, Medicare
Greenberg et al., 1988	P, O	1973-76, NH and VT Central Tumor Registry; hospital records	Odds of undergoing surgery vs. radiation and/or chemotherapy; mortality due to all causes	Non-small-cell lung cancer	1,808 hospital charts	Private vs. other or none
•Haas et al., 1991	0	1984 and 1987; MA hospital discharge abstracts and vital statistics records (linked)	LBW (2,500,500grams) orprematurity (ICD-9-CM code 764.0-765.1)	Inhospital, single gestation births	57,257 (1984) and 64,346 (1987)	Privately insured vs. Medicaid vs. uninsured

•Hadley et al., 1991	P, O	*1987,* private national hospital discharge abstracting service	ALOS; probability of specific diagnosis-related procdures; probability of a high-cost and/or high discretion procedure; probability of a "not abnormal" biopsy result; RAMI value; probability of a weekend (i.e., emergency) admission	Various, and all	*592,598* discharges, 1,200 hospitals	Private=BCor insurance company; uninsured=no charge or self-pay
Hand et al., 1991	0	1988, IL hospitals with cancer registries	Late stage (Stages IIb through IV) at diagnosis	Breast cancer	9 hospitals	"All other" insured vs. Medicaid and uninsured combined
* Hayward et al., 1988	u	1986, RWJF national access survey interviews	Whether (all) patients had a regular or usual source of care; whether serious or chronically medically ill patients needed but could not get care	All, and serious or chronic medical illness	5,920 adults ages 22 to 64; 2,927 adults >22 with chronic or serious medical problems	Insured=government or private; uninsured
Howell et al., 1991	u, P, o	1983, Medicaid tape-to-tape data, CA birth-death cohort file, census data	Probability of late initiation of prenatal services, birthweight	Prenatal care, birth	13,010 deliveries	Short-term Medicaid enrollees vs. long-term Medicaid enrollees;non-MedicaWovwed mothers in low-income areas vs. high-income areas
•Hubbell et al., 1989	u	Oct. 1987-Jan. 1988 telephone survey of low-income households, Orange County, CA	Regular source of care; physician visit vs. not; preventive services	Not specified	652 low-income adults and their families, including 231 children <18 years	Insured vs. not
Kelly, 1985	P	1977, NCHSR Hospital Studies Program data	ALOS, average number of procedures	All	246,637 patients	Private insurance vs. Medicaid vs. "no charge"
Krieger et al., 1992	o, P	July 1983-Sept. 1988, WA Medicaid eligibility files and birth certificate files	initiation of prenatal care, adequacy of prenatal care; % of LBW (<2,500 grams) infants in group	Births	10,631 pregnant women	Medicaid managed care vs. Medicaid FFS vs. non-Medicaid managed care
Martin et al., 1984	P	1978, New York State Case Mix Study data from NY hospitals	Average total cost per patient; average routine cost per patient; average ancillary cost patient[c]; ALOS in days	All	296,000 patients in 28 hospitals	Medicare vs. Medicaid vs. Blue Cross vs. all payers combined
•Melnickand Mann, 1989	P,O	1982, NJ hospital patient discharge data	Direct patient care costs per cased; LOS	All	269,510 discharges	Private=BC and commercial; public= Medicaid, Medicare; uninsured= self-pay; and other

[c]First, costs from all non-revenue-producing general service department (e.g., laundry) were allocated to revenue-producing ancillary departments (e.g., radiology) and to clinical services (e.g., pediatrics). These departmental costs were then assigned to patients. A patient's total ancillary costs were calculated by multiplying each patient's charges within each department by the departmental costs-to-charge ratios obtained from the facility's Uniform Financial Report. Routine costs were calculated from the days spent in each clinical service multiplied by that service's routine costs per day. For purposes of the analysis, "full costs" were based on actual inpatient costs, and "leveled full costs" were adjusted to reflect differences in salaries and utility costs between hospitals because of geographic location. Outliers, defined as cases within a DRG whose length of stay exceeds the DRG mean by 2 standard deviations or more, were excluded from most (number unspecified) comparisons of average costs.

[d]Direct patient care costs exclude overhead (or indirect costs), capital, direct teaching, and other nonpatient care costs. Some error was introduced by the allocation of joint costs, which occurred in calculating the departmental cost-to-charge ratios.

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Table E-l—Methodological Features of Studies Examining Relationships Between Insurance Coverages, Utilization, Process, or Outcomes of Health Care-Continued

Study author(s) and year of publication	u, P or 0[e]	Year and source of study data	Indicator	Condition or procedure	Number of cases and study population	Insurance status comparison(s)
.Needleman et al., 1990	u	1980, NMCUES aged to depict 1988 using the Health Benefits Simulation Model	Average number of visits per person; hospital inpatient admissions per 1,000 persons; hospital outpatient visits per 1,000 persons; reports of not receiving needed care	All	Approximately 6,600 households consisting of 17,900 persons	uninsured vs. insured
Oberg et al., 1991	P	Feb. -Jun. 1988; interviews with a sample of women who recently delivered at 6 hospitals in Minneapolis, MN	Satisfaction (with continuity of providers, waiting times at prenatal visits, and the way in which treated by provider)	Delivery/pre-natal care	149 women (50 in each insurance group)	Uninsured vs. Medicaid vs. privately insured
Norris and Williams, 1984	o	1968 and 1978; CA vital statistics and hospital claims data	Birthweight and perinatal mortality	Delivery	695,442 births	Private=high-income women not covered by Medi-Cal; public= Medi-Cal; uninsured=low-income not covered by Medi-Cal
.Robert Wood Johnson Foundation, 1987	P	1986; National Access Survey via telephone interviews	Satisfaction (with most recent ambulatory visit, emergency visit, or hospital stay) among those who had such visits or stays	All	10,130 adults 18 and over	Uninsured=lacking coverage under an HMO, Medicare, Medicaid, other government health insurance, self-paid health insurance or employer-paid health insurance
.Rosenbach, 1985	u	1980 NMCUES; ARF data on supply of PCPS and ERs; State-level price data	Regular source of care	All[e]	1,409 children ages 1 through 17 living in families below150 percent of the Federal poverty level	Medicaid vs. private insurance vs. no insurance
.Rosenbach, 1989	u	see Rosenbach, 1985	Any physician visit, number of physician visits per child, physician visits per child with visit, differentiated by setting (any vs. office)	see Rosenbach, 1985	see Rosenbach, 1985	see Rosenbach, 1985
" Short and Lebfkowitz, 1991	u	1987 NMES	Any visit; probability of a well-child visit; adherence to the MP schedule for well-child visits[g]	All	2,695 preschool children ages 1 through 4	Uninsured all year vs. privately insured all year vs. Medicaid all year (and no private insurance)

[e]The study also differentiates between children with excellent/good health and no activity limitation, and children in fair/poor health or with an activity limitation.
[f]For most children, parents were interviewed as proxies.
[g]Only the findings for the probability of a well-child visit is included in this background paper.

Soumerai et al., 1991[h]	O	July 1980-June 1983; NH and NJ Medicaid Management Information System and enrollment files for Medicaid- and Medicare-covered patients	Admissions to nursing home or hospital	Diabetes heart disease, chronic obstructive pulmonary disease and asthma, seizures, or conditions requiring the use of anticoagulants	1,786 patients age 60 and older using 3 or more drugs with potential for institutionalization as a result of sudden withdrawal	Before and after cap imposed on prescription drug payment; and comparison of NH admissions to NJ admissions during study period
•Stafford, 1990	P	1986, all CA nonmilitary hospitals	Cesarean section; repeat C-section	Delivery	461,066 deliveries	Private= BC/BS and other private, Kaiser Permanence, other HMOs; pubiic=Medi-Cal; uninsured=self-pay, indigent services; other= Medicare, workers compensation, Title V,[i] other government other nongovernment, and no charge[d]
•Stafford, 1991	P	see Stafford, 1990	Repeat C-section	Delivery	45,425 women with previous C-sections	see Stafford, 1990 above
U.S. Government Accounting Office, 1987	u	1 986-87, personal interviews with women in hospitals in 8 States[k]	Women's self-reports of when prenatal care was started, how many prenatal care visits were received, and what barriers prevented women from getting prenatal care earlier or more often	Delivery/pre-natal care	1,157 women (in 39 hospitals, in 32 corm munities, in 8 States)	Medicaid and uninsured
•Weissman and Epstein, 1989	P,o	1983, data on patients in Boston, MA, metropolitan area nonfederal hospitals, as listed in MA Rate Setting Commission discharge abstracts	LOS, number of procedures, case-mix severity index	All	65,032 patients at 52 hospitals	Private=BC; public= Medicaid; uninsured= self-pay or free care

[h]The data i, Soumerai et al.'s study were collected in 1980 or after, but results of the study are not included in the bar graphs used to suggest magnitude and variation because of the unusual nature of the study and because many patients were 65 and older.
[i]Title V of the Social Security Act covers the Maternal and Child Health Block Grant Program, administered by USDHHS.
[j]In most studies, patients whose records marked "no charge" are considered uninsured. "No charge" accounted for 1,292 deliveries in Stafford's study.
[k]The States were Alabama, California, Georgia, Illinois, Maine, Massachusetts, New York, and Virginia. States were selected in order to represent States with large Medicaid programs, to cover most regions of the country, and to obtain a mix of Medicaid programs in terms of eligibility and benefits.

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Table E-l—Methodological Features of Studies Examining Relationships Between Insurance Coverages, Utilization, Process, or Outcomes of Health Care

Study author(s) and year of publication	u, P or O[a]	Year and source of study data	Indicator	Condition or procedure	Number of cases and study population	Insurance status comparison(s)
.Weissman, Gatsonis, and Epstein, 1991	0	1987, MA hospital discharge abstracts from the MA Health Data Consortium; MD data from Managed Health Care Services; 1988 CPS March supplement for number of residents by insurance status by State in 1987	Population-based rates of admission for 12 avoidable hospitalizations as identified by a physician panel	See note for list of Conditions[l]	Patients up to 64 years; sample sizes not given	Private=all group health insurers, BC, commercial; Medicaid; uninsured= expected to be self-pay or free care
Weissman, Stern, Fielding, et al., 1991	u	1987, personal interviews; at or shortly after admission of patients who had been hospitalized in eastern MA	Delays in receiving care as a reason for hospitalization	All except obstetrics and psychiatry	12,068 consecutive adult patients (mean age 55) in 5 hospitals	Private=BC, HMO, or commercial; public= Medicaid, Medicare; uninsured
* Wenneker et al., 1990	P	1985, MA general acute care hospitals; discharge data submitted to the MA Rate Setting Commission	Use of 3 cardiac procedures	Patients diagnosed with circulatory disorders or having chest pain[m]	37,994 MA residents ages 35 to 64	Private=BC/BS, commercial; Medicaid; uninsured=self-pay or free care
.Woolhandler and Himmelstein, 1988	u	1982 NHIS	Inadequate receipt of preventive(early detection) services[n]	Hyptertension; Pap smear; clinical breast examination; glaucoma test	10,653 women aged 45 to 64	Insured=covered by a private plan, Medicaid or other public assistance program, Medicare, or military health insurance; uninsured=all others
Yelin et al., 1983	u	1976 NHIS	Total number of physician visits; total number of hospitalizations	9 discrete conditions (for 7,612 individuals)	7,612 individuals with 9 discrete conditions and 2,000 randomly selected respondents	Some vs. no insurance coverage

[l]Ruptured appendix, asthma, cellulitis, congestive heart failure, diabetes, gangrene, hypokalemia, immunizable conditions, malignant hypertension, pneUmOnia, pyelonephritis, bleeding ulcer.
[m]Receiving coronary arteriography, coronary artery bypass graft (CABG), or coronary angioplasty was deemed equivalent to having chest pain.
[n]Inadequate was defined as a screening interval of 1 year or more longer than the optimal, as defined by various expert panels on the adequacy Of Screening.
[o]The 9 conditions were rheumatoid arthritis, osteoarthritis, tendonitis, lower back pain, angina pectoris, chronic ischemic heart disease, hypertension, emphysema, and diabetes.

Yergan et al., 1988	P, O	1970-73, data 17 hospitals with sufficient patient loads, randomly selected from PAS database	Number of radiographic procedures, consultations, and surgical procedures, LOS, inhospital death	Pneumonia	4,369 patients	BCvs. Medicare vs. Medicaid vs. self-pay
● Young and Cohen, 1991	O	1987, discharge abstracts from MA nonfederal hospitals	Inhospital mortality and deaths within 30 days of discharge	Emergency admission for AM I (heart attack)	4,972 patient discharges	FFS private insurance (BC or commercial) vs. HMO enrollees; vs. "self-pay" or "free care" as anticipated source of payment

NOTE: *=study is included in graphs with estimates of magnitude and variation.

KEY:

AAP=American Academy of Pediatrics
AHA=American Hospital Association
AHCPR=Agency for Health Care Policy and Research (USDHHS)
ALOS=average length of stay
AMI=acute myocardial infarction
ARF=Area Resource File (county level data collected and supplied by the USDHHS)
BC=Blue Cross
BS=Blue Shield
CA=California
CHAS=Center for Health Administration Studies
CHP=Community Hospital Program (RWJF)
CPHA=Commission on Professional and Hospital Activities
CPS=Current Population Survey (U.S. Department of Commerce, Bureau of the Census)
DC= District of Columbia
DRG=diagnosis related group
ER=emergency room
FFS=fee-for-service (reimbursement for health care)
FL=Florida
HMO=health maintenance organization
IL=Illinois
IPA=independent practice association
LBW=low birthweight
LOS-length of stay
MA=Massachusetts
MD=Maryland
MN= Minnesota
NCHSR=National Center for Health Services Research (now AHCPR)
NH=New Hampshire
NHIS=National Health Interview Survey (USDHHS)
NJ=New Jersey
NMCUES=National Medical Care Utilization and Expenditure Survey (USDHHS)
NMES=National Medical Expenditure Survey (USDHHS)
NY=New York
PAS=Professional Activity Service (CPHA)
PCP=Primary care physician
RAMI=Risk-Adjusted Mortality Index
RWJF=Robert Wood Johnson Foundation
UHDDS=Uniform Hospital Discharge Data Set
USDHHS=U.S. Department of Health and Human Services
VT-Vermont
WA-Washington

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

Table E-2—Patient Factors Commonly Adjusted for Statistically in Selected Studies[a]

	Individual demographic factors						Individual health factors	
Study	Age	Gender	Race	Education	Income	Marital status	Physiological health status[b]	Comorbidities
Braveman et al., 1989	—	—	X	—	—	—	X	X
Braveman et al., 1991	—	—	X	—	—	—	X	X
Burstin et al., 1991	X	X	X	—	X	—	—	—
Chen and Lyttle, 1987	X	X	X	X	X	—	X	—
Cornelius, 1991	X	X	X	X	X	—	X	—
Epstein et al., 1990	—	—	—	X	X	—	X	—
Haas etal., 1989	X	—	X	X	X	X	—	—
Hadley etal., 1991	X	X	X	—	—	—	X	X
Hayward et. al., 1988	X	X	X	—	X	—	X	—
Hubbell et al., 1989	—	—	X	—	X	—	—	—
Melnick and Mann, 1989	X	X	—	—	—	—	X	—
Needleman etal., 1990	X	—	—	—	—	—	X	—
Robert Wood Johnson, 1987	—	—	—	—	—	—	X	—
Rosenbach, 1985	—	—	—	—	—	—	—	—
Rosenbach, 1989	X	—	X	X	X	—	X	—
Short and Lefkowitz, 1991	X	X	X	X	X	—	X	—
Stafford, 1990	X	—	X	—	—	—	—	X
Stafford, 1991	X	—	X	—	X	—	—	X
Weissman and Epstein, 1989	X	X	—	—	—	—	X	X
Weissman, Gatsonis, etal., 1991	X	X	X	—	X	—	—	—
Weissman, Stern, etal., 1991	X	—	—	X	X	—	X	X
Wenneker et al., 1990	X	X	X	—	X	—	X	—
Woolhandler and Himmelstein, 1988..	—	—	X	X	X	—	X	—
Young and Cohen, 1991	X	X	X	—	X	—	X	X

KEY: X = factor was controlled in some way in study. —= factor was not controlled in study.

[a]Not all factors adjusted for statistically in each study are shown. For example, some studies adjusted for patient's residence and level of employment (e.g., 27). Studies also defined and grouped factors indifferent ways. For example, race could be categorized as white vs. nonwhite or in five independent categories (black, white non-Hispanic, Hispanic, Asian, other).

[b]In general, studies used proxies for physiological health status (e.g., perceived health status, number of days in bed in past year).

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

Table E-3—Institutional Factors Commonly Adjusted for Statistically in Selected Studies[a]

		Hospital characteristics						
Study	Location	Teaching status	Ownership[b]	Size	Specialized unit available	Volume of service	Hospital charges	ALSO[c]
Braveman et al., 1989	—		X	—	—	—	—	—
Braveman et al., 1991	—	X	X	—	X	—	—	—
Burstin et al., 1991	X	X	X	—	—	—	—	—
Chen and Lyttle, 1987	—	—	—	—	—	—	—	—
Cornelius, 1991	—	—	—	—	—	—	—	—
Epstein et al., 1990	—			—	—	—	—	—
Haas et al., 1989	—			—		—	—	—
Hadley etal., 1991	X	X	X	X		—	—	—
Hayward et. al., 1988	—	—	—	—	—	—	—	—
Hubbell et al., 1989	—	—	—	—	—	—	—	—
Melnick and Mann, 1989	X	X		—		—	—	—
Needleman et al., 1990	—			—		—	—	—
Robert Wood Johnson, 1987	—		—	—	—	—	—	—
Rosenbach, 1985	—	—	—	—	—	—	—	—
Rosenbach, 1989	—	—	—	—	—	—	—	—
Short and Lefkowitz, 1991	—			—		—	—	—
Stafford, 1990	—			—		—	—	—
Stafford, 1991	—	X	X	—	X	X	—	—
Weissman and Epstein, 1989	—	—	—	—	—	—	—	—
Weissman, Gatsonis, et al., 1991	—	—	—	—	—	—	—	—
Weissman, Stern, et al., 1991	—			—		—	—	—
Wenneker et al., 1990	—	X		—		—	—	—
Woolhandler and Himmelstein, 1988..	—	—	—	—	—	—	—	—
Young and Cohen, 1991	—	X	X	—	X	—	—	—

KEY: X = factor was controlled in some way in study. — = factor was not controlled in study.
[a]Not all factors adjusted for statistica lly in each study are shown. For example, some studies made adjustments forthe overall level of hospitals' socioeconomic characteristics (e.g, proportion of patients covered by Medicaid or uninsured) (25), or the availability of health services in a geographic area (124).
[b]Ownership means, for example, public vs. private, or for-profit VS. not-for-profit.
[c]Average length Of stay.

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

Appendix F

The Health Effects of Varying Levels of Cost Sharing in a Generous Private Health Insurance Plan: The RAND Health Insurance Experiment

As noted in appendix C of this background paper, definitive conclusions about the relative impacts of insurance coverage vs. lack of coverage are difficult to draw because there have been no truly experimental studies testing the effects of not having insurance. It is important to note that the RAND Health Insurance Experiment (HIE) was designed to examine levels of cost-sharing among privately insured patients and ***not* the impact of being uninsured (21).** The fact is that all the HIE participants benefited from the assurance that at least part of their health care bills would be paid by an insurer. Further, the maximum that could be paid out-of-pocket by any HIE participating family was $1,000 per year (in 1982 dollars), or a lesser amount adjusted for income (21). For some, coverage was entirely "free" because no premium was charged for any plan (21).[1] Finally, any family assigned to a plan that offered less coverage than its insurance before the HIE was reimbursed an amount equal to its maximal ***possible*** loss. As a consequence, it is difficult to draw inferences from HIE findings about the effects of lack of insurance on health outcomes. The findings of the HIE can be useful, however, in demonstrating whether cost-sharing results in delaying or forgoing care within the context of a generous benefit package,[2] and the health effects that delaying or forgoing care may cause.[3]

For the most part, and particularly for persons with ''average' income and health,[4] the HIE found that health outcomes were neither significantly improved when care was free, nor adversely affected by requirements for cost sharing (20,21,81,121 ,171). Exceptions included findings that functional far vision (21) and dental and oral health (8) improved for individuals receiving free care. These findings may be of particular interest because dental and vision services are often not covered, or subject to many limitations, in private insurance plans (153, also see appendix D).

When analytic efforts were concentrated on adults who were initially in ill health (in the bottom quarter of a range of health status indicators) and living in low-income families (below $7,300 in 1982 dollars), cost-sharing (as opposed to free care) had statistically significant adverse effects on the specific physiologic measures of blood pressure and vision and on the relative risk of dying related to three major risk factors (i.e., smoking more than a pack of cigarettes a day, high cholesterol, high systolic blood pressure), but not on a range of other measures including perceived health status.

It is unclear to what extent the findings of the HIE would hold in the current health care and family income environment (e.g., at current cost-sharing levels, with greater efforts to manage care). This issue is important to current health care reform proposals. In its main report, scheduled to be published in 1993, OTA will examine the internal and external validity of the HIE and other studies of the impact of various cost-sharing arrangements on utilization, process, and health outcomes.

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1 Premiums are not typically considered part of patient cost sharing.

2 All plans covered ambulatory and hospital care, preventive services, most dental services, psychiatric and psychological services (limited to 52 visits a year), and prescription drugs.

3 "f'he Rand HIE is also important because it measured various aspects of health care services, including the utilization, process, and quality of care (21,80,102).

4 Generally, "average" refers to families in the middle two-fifths of the income and health distributions (21).

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