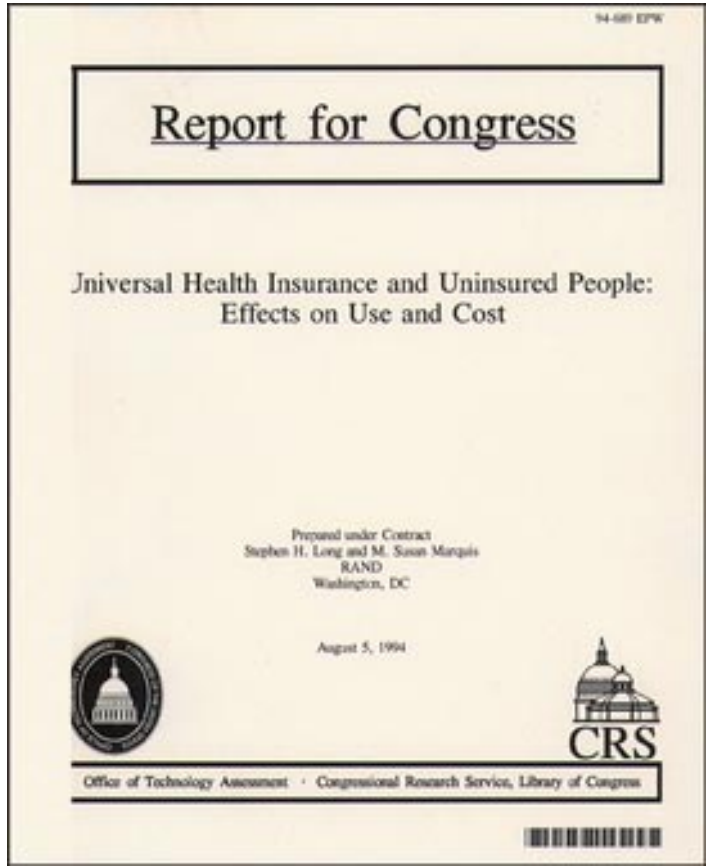
Universal Health Insurance and Uninsured People: Effects on Use and Cost

September 1994

NTIS order #PB95-109724



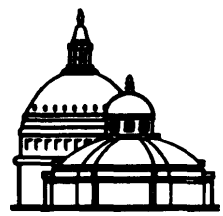
94-689 EPW

Report for Congress

Universal Health Insurance and Uninsured People: Effects on Use and Cost

Prepared under Contract
Stephen H. Long and M. Susan Marquis
RAND
Washington, DC

August 5, 1994



CRS

Office of Technology Assesnent .Congressional Research Service, Library of Congress

UNIVERSAL HEALTH INSURANCE AND UNINSURED PEOPLE: EFFECTS ON USE AND COST

SUMMARY

Many health reform proposals call for universal coverage. Measuring both the benefits and the costs of universal coverage requires good estimates of the impact of new insurance coverage on the quantity of health services used by the 37 million people now uninsured and on the expenditures for that additional use. Using data from three large surveys of the U.S. population, this report develops estimates of the gap in health services utilization between insured and uninsured people, Based on estimates of this "access gap, " the report examines implications for national health expenditures and for the adequacy of existing health care resource capacity,

The key findings of this analysis are:

- In a single year, adults reporting a complete lack of health insurance have 61 percent as many ambulatory health services contacts and 67 percent as many inpatient hospital days as a comparable group with health insurance coverage.

- There is also an access gap for uninsured children, although it is somewhat smaller than that for uninsured adults. Children lacking insurance coverage have 70 percent as many ambulatory contacts and 81 percent as many inpatient hospital days as do otherwise similar children with coverage all year.

- For both adults and children, the gaps for people reporting fair or poor health are greater than those for people reporting excellent or good health.

- Filling this access gap for all previously uninsured people would lead to an estimated annual increase in total ambulatory contacts of 55 million (3.8 percent), and an estimated increase in total inpatient hospital days of 6.1 million (3.6 percent). *In the aggregate*, the health care system has adequate capacity to absorb these increases in utilization.

- The currently uninsured would use a total of $60.5 billion (in 1993 dollars) of physician and hospital services under universal coverage -- $40.6 billion that would have been consumed had they continued to be uninsured, plus $19.9 billion of new resources represented by the access gap. This 19.9 billion, which represents 2,2 percent of total national health expenditures, is a "best estimate, " Tests of the sensitivity of this estimate to use of any one of various alternative sources of data and assumptions suggest that it could range from $16 billion to $29 billion, or from 1.8 percent to 3.2 percent of national health spending.

- New insurance premiums for the previously uninsured might total between $60 billion and $70 billion. This would pay both for the services currently provided to the uninsured, but financed through taxes, "cost-shifting, " and out-of-pocket payments, and for some of the additional services demanded once they were insured,

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACKNOWLEDGEMENTS

This report was sponsored by the Office of Technology Assessment (OTA), the Congressional Research Service (CRS), and the Robert Wood Johnson Foundation (RWJF). Any views expressed herein should not necessarily be attributed to OTA, RWJF, or RAND. Helpful comments on an earlier draft were provided by Lu Ann Aday, Karen Davis, Paula Diehr, Deborah Freund, Chip Kahn, Lawrence Klein, Patricia Nazemetz, Charles Nelson, Joseph Newhouse, Carl Scott, Pamela Farley Short, and Patricia Willis. Several staff of the sponsoring organizations made helpful comments on drafts, as well as facilitating the study and its publication: including Denise Dougherty and Tami Mark from OTA; Janet Kline, Mark Merlis, Madeleine Smith, Mallary Stouffer, and Michelle Harlan from CRS; and Joel Cantor from RWJF. The authors thank Roald Euller and Ellen Harrison for computer programming assistance and Jeff Miller and Audrey Smolkin for research assistance.

EXECUTIVE SUMMARY

Many health reform proposals call for universal coverage. Universal coverage would mean extending coverage to the 37 million people who are currently without health insurance. Measuring both the benefits and the costs of universal coverage requires good estimates of the impact of new insurance coverage on the quantity of health services used by those now uninsured and on the expenditures for that additional use. Using the best available data from three large surveys of the U.S. population, this report develops estimates of the gap in health services utilization between insured and uninsured people that is, the "access gap. " Based on those estimates, the report examines the implications of that gap for national health expenditures and for the adequacy of existing health care resource capacity.

The key findings of this analysis are summarized below:

- In a single year, adults reporting a complete lack of health insurance have 61 percent as many ambulatory health services contacts and 67 percent as many inpatient hospital days as a comparable group with health insurance coverage, (Ambulatory contacts include contacts in person or by telephone with a physician or other medical provider working in a physician's office, clinic, or hospital emergency room or outpatient department.)

- There is also an access gap for uninsured children, although it is somewhat smaller than that for uninsured adults. Children lacking insurance coverage have 70 percent as many ambulatory contacts and 81 percent as many inpatient hospital days as do otherwise similar children with coverage all year.

- For both adults and children, the gaps for people reporting fair or poor health are greater than those for people reporting excellent or good health.

- Under universal coverage, filling this access gap for all the previously uninsured would lead to an estimated increase in total annual ambulatory contacts of 55 million (3. 8 percent), and an estimated increase in total annual inpatient hospital days of 6.1 million (3.6 percent). *In the aggregate*, the health care system has adequate capacity to absorb these increases in utilization.

- The currently uninsured would use a total of $60.5 billion (in 1993 dollars) of physician and hospital services under universal coverage -- $40.6 billion that would have been consumed had they continued to be uninsured, plus $19.9 billion of new resources represented by the access gap. This 19.9 billion, which represents 2.2 percent of total national health expenditures, is a "best estimate. " Tests of the sensitivity of this estimate to use of any one of various alternative sources of data and assumptions suggest that it could range from $16 billion to $29 billion, or from 1.8 percent to 3.2 percent of national health spending. From one perspective, spending by the previously uninsured would increase substantially -- by about 50 percent -- once they obtain coverage. On the other hand, this increase represents relatively few resources when compared to the total spent by the U.S. on health care and its administration.

- New insurance premiums for the previously uninsured might total between $60 billion and $70 billion. This would pay both for the services currently provided to the uninsured, but financed through taxes, "cost-shifting," and out-of-pocket payments, and for some of the additional services demanded once they were insured. This is a rough estimate -- its size would depend on the cost-sharing provisions of the reform plan, the services included in its benefit package, the mix of managed care and indemnity plan enrollments, and their administrative costs .

- A number of factors could affect the estimates in this report (see Overview of Methods and Assumptions).

The major contribution of this study is to narrow considerably estimates of the access gap presented in the previous literature. As shown in its review of previous studies, earlier estimates placed use of physician visits by the uninsured at between 46 and 100 percent of use by the insured, and use of inpatient hospital services by the uninsured at between 12 and 81 percent of use by the insured. With a range this large, estimates of the effects of universal coverage were very uncertain. By applying uniform estimation methods to all of the major national surveys from the mid- to late 1980s, the uncertainty of this aspect of health reform estimates is reduced considerably.

In contrast, the estimates of the costs of universal coverage presented here are necessarily less precise than the estimates of the access gap measured in terms of relative use. This is because the available expenditure data are more limited, necessitating numerous assumptions to be made. Moreover, the figures derived in this analysis do not represent predictions of what would happen under any particular health reform proposal that would achieve universal coverage. Any such predictions would have to consider many aspects of the particular reform proposal, which is beyond the scope of this study.

This research was conducted by RAND analysts Stephen H. Long and M. Susan Marquis under a contract from the U.S. Congress's Office of Technology Assessment (OTA); under a contract from the Congressional Research Service, Library of Congress; and under a grant from the Robert Wood Johnson Foundation. The OTA support came as part of its assessment *Technology, Insurance and the Health Care System.*

Overview of Methods and Assumptions

This report provides point estimates of the "access gap" in ambulatory health services contacts and inpatient hospital days per person using the best available data from three recent large national surveys of the U.S. population, The estimates are based on reported health services used by those who are uninsured for a full year and by those who have private employer-sponsored health coverage for a full year; and they are based on people younger than 65 years of age, The report focuses primarily on physician and hospital services both because these services account for most of the spending under private employer-sponsored insurance because most health reform plans would provide the previously uninsured with coverage under this source or its equivalent. The focus is on the nonelderly because they represent 99 percent of the uninsured in the U.S.

The report also estimates the aggregate access gap for the U.S. and it estimates the implications for national health spending of providing universal health insurance coverage, Data on current and projected physician and hospital capacity are used to examine the impact of the added demand for resources that universal coverage would entail; but the interaction between geographic variation in additional demand and available capacity could not be explored with these data. The spending implications are estimated by combining the estimates of additional resource use under universal coverage with the leading source of current information on aggregate physician- and hospital-related health care expenditures, Finally, the report illustrates the projected impact of covering all currently uninsured people on total premium costs,

Methods

The measure of the access gap is based on estimated current use of hospital and physician services by people who were uninsured for a full year and a predicted value of what each person would use if he or she were covered for the year by a plan now typical of those covering people with employer group coverage. Use is predicted from a multivariate model of health services use that includes explanatory variables for health insurance status, demographic and economic characteristics, and health status. Separate models are estimated for adults and children and from each of the three surveys. Annual health care use is estimated for uninsured people and simulated as if they were insured for a full year. The resulting estimates were averaged to produce the measures reported in this summary.

To measure the aggregate volume of increased service use under universal coverage, the predicted access gap was adjusted in two ways. First, people with part year periods of being uninsured had partial access gaps attributed to them, reflecting higher use while insured and lower use while uninsured. Second, the sample was reweighted to reflect the size and age-sex composition of the uninsured population in 1992. The estimates of resource costs are the product of this estimate of increased aggregate demand by the formerly uninsured and the unit costs of each physician and

hospital service calculated from the Health Care Financing Administration's estimates of national health expenditures and U.S. Public Health Service estimates of aggregate use. The unit cost estimates were projected to reflect 1993 dollars based on annual rates of growth in per capita hospital and physician spending.

Assumptions and Limitations

In several ways, these estimates represent a partial analysis of the cost of extending health insurance overage to the currently uninsured. First, they assume that other aspects of the existing health care financing and delivery system remain unchanged. It is assumed that the policies covering the newly insured under universal coverage would contain the same mix of health maintenance organization and fee-for-service benefits, scope of services, and cost-sharing provisions as those held by the currently insured, However, health reform has a second objective: to reduce the growth in health care spending and the use of inappropriate services by promoting managed care, prudent purchasing, and competition among providers and insurers. If these efforts lower the insured norms for use and spending, then these partial estimates overstate the cost of insuring the uninsured.

The estimates also assume that prices for care do not change in response to either the increased demand for services from implementing universal coverage or the decreased demand for services resulting from cost containment efforts. Finally, only the cost of providing insurance to those who now lack insurance is included; but not the cost of adding benefits for Americans who already have some coverage.

There is some uncertainty surrounding the estimates in this report. First, they rely on assumptions that cannot always be tested with extant data. It is assumed that the currently uninsured, once insured, would use care at the same rate as currently insured persons with similar, and observed, economic and demographic characteristics. This assumption can only be tested through a controlled experiment. The cost estimates rest even more heavily on assumptions than do the estimates of the increased quantity of use because of data limitations. They rely on estimates of the average costs of different services, and assume that this average applies across all individuals and does not vary with quantity. Some of these assumptions were tested where ancillary data exist. The evidence suggests that the estimates are not so sensitive to the assumptions as to negate the qualitative conclusion about the effect of universal access on health care costs.

UNIVERSAL HEALTH INSURANCE AND UNINSURED PEOPLE: EFFECTS ON USE AND COST

CHAPTER 1. INTRODUCTION

Numerous health care reform proposals are before the Congress, calling for dramatic changes in the current system that, if passed, would represent possibly the most significant social policy reform since the passage of the Social Security Act. On many points the various proposals differ, But there is general agreement on some principles among many of the various plans. For example, many of them call for guaranteed insurance coverage for all Americans,

Long-standing advocates of universal coverage point to the lower use of health services by the uninsured than by the insured as evidence of poor access to health care services for the uninsured. If the insured use the appropriate quantity of services, then one implication of the lower use by the uninsured is said to be a reduction in health status and productivity, The larger the gap in use, the greater the expected benefits of universal access in improved health for the uninsured and in increased output.

Universal coverage may also benefit those who currently finance health care. One component of current health care costs, particularly of inpatient and outpatient hospital costs, is uncompensated care for the uninsured. These costs are thought to be "shifted" to other payers -- including private insurers, whose costs are passed on to business in higher premiums, and taxpayers supporting local public hospitals. National health reform is intended to finance the care of the uninsured in some other way. Therefore, one benefit of reform may be relief to those now paying the "cost-shift." The larger the gap in use between the uninsured and the insured, however, the less the extent of current cross subsidies, and hence the smaller the benefit to those paying the cost-shift.

Universal coverage is likely to increase the use of health care services by the previously uninsured, thus drawing additional resources into the provision of health services, The additional resource cost of universal access will be greater the larger the current access gap and hence the greater the expected increased demand resulting from the extension of insurance benefits to the uninsured.

Thus, measuring both the benefits and social costs of reform requires precise estimates of the access gap. Here represent estimates of the gap and its implications for the cost of national health reform based on the best available data. Our estimates, in several ways, represent a *partial* analysis of the costs of extending health insurance coverage to the currently uninsured.

First, the estimates assume that other aspects of the existing health care financing and delivery system remain unchanged. That is, universal coverage is assumed to induce the

currently uninsured to consume health services at the rate that the insured currently consume, assuming that the policies covering the newly insured would contain the same mix of HMO and fee-for-service benefits, scope of services, and cost-sharing provisions as held by the currently insured, However, health reform has a second objective -- to reduce the growth in health care spending and the use of inappropriate services by promoting managed care, prudent purchasing, and competition among providers and insurers, If these efforts lower the insured norms for use and spending, then our partial estimates overstate the cost of insuring the uninsured.

Another dimension on which our estimates are limited is the types of services considered. Available utilization data cover inpatient hospital care and ambulatory care at all sites, mostly by physicians. Our estimates of the access gap are limited to these services. By assuming that the access gap for inpatient physician services (for example, surgery) is the same as that for ambulatory care, our cost estimates apply to all hospital and physician services. These services represent a very large proportion of the spending under health insurance plans for the nonelderly population. Depending on the covered benefits of any particular reform plan, however, our estimates may understate the incremental cost. We illustrate the magnitude of this omission by estimating the total cost required to add prescription drugs to the services we consider.

Our estimates also assume that prices for care do not change in response to either the increased demand for services from universal coverage or the decreased demand for services from efforts to contain costs and reduce inappropriate service use. Because we estimate only a small induced demand from universal coverage, this assumption does not appear to be a very strong one.

Finally, universal coverage is intended to extend insurance protection to the 37 million Americans who now lack coverage, but it is also intended to improve protection for many Americans who have insurance coverage but are underinsured, either because the scope or generosity of their benefits is inadequate or because coverage for certain pre-existing health problems is excluded from coverage. Our estimates do not include the costs of eliminating undercoverage.

There is some uncertainty surrounding the point estimates that we report. First, the estimates of increased use are based on surveys, and such estimates can differ from the true population values because of sampling error. Second, our estimates rely on assumptions that cannot always be tested with extant data. We assume that the currently uninsured, once insured, would use care at the same rate as currently insured individuals with similar economic and demographic characteristics. This is an assumption that is made in any observational study of behavioral response, and can only be tested through a controlled experiment.

Our estimates of cost rest even more heavily on assumptions than do the estimates of the increased quantity of use because there is limited information about health care expenditures in the aggregate and even more limited information about how spending varies among different groups of individuals and with the quantity of service consumed. As a result, we have had to rely on estimates of average costs of different services and

assume that the average applies across all individuals and does not vary with quantity. Where even limited ancillary information exists to test this assumption, we have reported estimates of the sensitivity of our point estimates to the assumption. Despite some uncertainty about the actual magnitude of the cost of universal coverage, informed debate requires the best estimate that can be obtained. We have sought to provide this. Moreover, the evidence that we have found suggests that our estimates are not so sensitive to the assumptions as to negate the qualitative conclusion about the effect of universal access on health care costs.

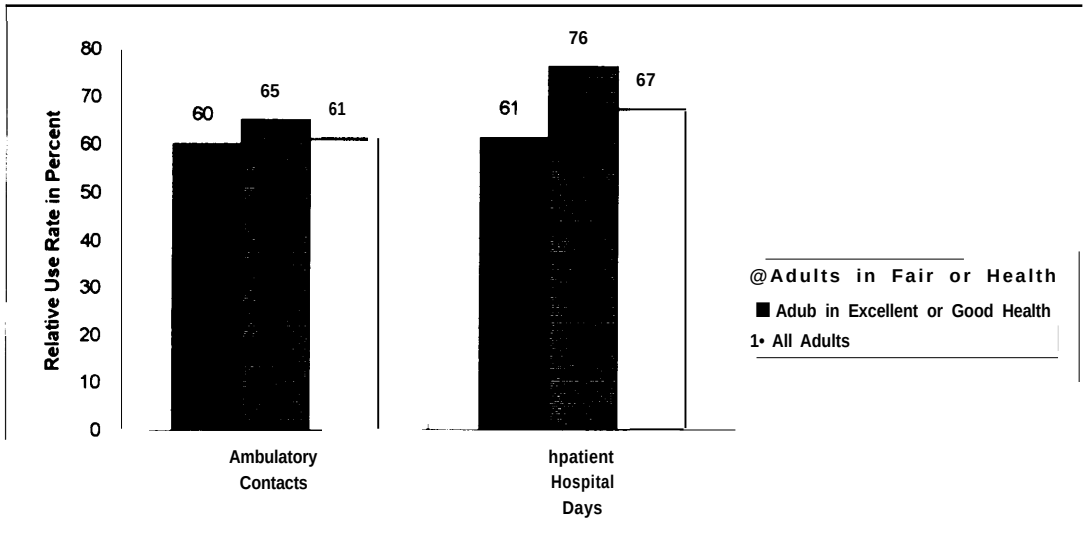
The next chapter is intended for the reader who is interested in a brief summary of our key findings, but not in the methodological detail about how they were obtained. It presents estimates of the differences in rates of ambulatory care use and inpatient hospital care use by insured and uninsured individuals and the implication of those differences for the cost of national reform. Chapters 3 and 4 provide the technical detail of our estimation. Chapter 3 presents the methods for estimating relative use by the insured and uninsured, Chapter 4 describes how these relative use estimates are converted into estimates of aggregate costs.

CHAPTER 2. THE UNINSURED ACCESS GAP AND THE COST OF UNIVERSAL COVERAGE

THE GAP IN USE BETWEEN THE UNINSURED AND INSURED

Adults lacking health insurance coverage for a full year have about 60 percent as many ambulatory health services contacts and about 70 percent of the inpatient hospital days in the year as they would if they had health care coverage (Figure 1). This is shown in Table 1 which reports our estimates of the annual number of ambulatory contacts and inpatient hospital days for the uninsured and of the quantity of care that they would demand if insured for the year. The figures represent our "best" point estimates of the quantities based on an analysis of data from three large national surveys.[1] However, the estimates vary from survey to survey. Further, the estimates from any sample survey may differ some from those that would be obtained in a complete census. Details of our estimation methods, the quantity estimates from each survey, and our procedures for combining these into our best estimate are given in Chapter 3.

FIGURE 1. Health Service Use Rates by Uninsured Adults Relative to Expected Insured Use Rates



NOTE: Relative use rates are calculated separately for each group, based on their respective absolute rates (see Table 1). Therefore, the relative use rate for all adults is not a weighted average of those for the two subgroups.

[1]The Survey of Income and Program Participation, the Health Interview Survey, and the National Medical Expenditure Survey.

TABLE 1. Uninsured Access Gap for Adults
Predicted Use Rates for Uninsured Adults

Insurance Status of Person	Adults in Fair or Poor Health	Adults in Excellent or Good Health	All Adults
		Ambulatory Contacts Per Person	
Uninsured	4.9	2.2	2.7
Insured	8.1	3.4	4,4
Access gap	-3.2	-1.2	-1.7
Relative use	60%	65%	61%
		Hospital Days Per Person	
Uninsured	1.03	0.29	0.43
Insured	1,70	*0.38*	*0,64*
Access gap	*-0.67*	-0.09	-0.21
Relative use	61%	76%	67%

Under universal coverage, those who are currently without insurance would average about 1.7 additional ambulatory care contacts per person per year.[2] Part of this total increase would stem from an increase in the number of people seeking care in the year. With insurance, about 70 percent of those now insured would obtain some ambulatory treatment, up from the current rate of 52 percents The other part of the total increase would be an increase in the number of contacts by those currently uninsured who already receive some care; we estimate that the number of contacts among those who receive care would increase about 20 percent, to about 5.9 visits per user per year.

Currently uninsured adults would average 64 hospital days per 100 persons under universal health coverage, up from 43 days per 100 persons currently. This is due to a large increase in the number of admissions, which we estimate would rise by about 50 percent among the uninsured (up about 3 percentage points from the current rate of about 6 percent of them being admitted during a year).

[2]0ur estimates here refer to the full access gap, that is the difference in the health care that an individual would use if insured for a full year relative to use if uninsured for the full year. Some individuals are uninsured for only part of a year. and we take partial year insurance coverage into account in the next section when we convert these estimates into the costs of reform. See Chapter 4 for methodological details. We focus on estimating the average increase in quantities and costs. The actual increase in use will be zero for some uninsured individuals and much higher than the average we report for other individuals.

[3]Tables showing the access gap in both the probability of use and the number of visits by users are included in Chapter 3.

About 1/5 of uninsured adults report that their health is fair or poor and the gap between use of health care by these individuals and otherwise similar insured adults is greater than the access gap for healthier individuals (those who report their health is excellent or good). As a result, universal coverage is estimated to lead to greater than average gains in health service use for the less healthy among the uninsured. We estimate that their use of ambulatory care services would increase by an average of about 3 contacts per year and their inpatient hospital use would increase an average of about 2/3 of a day per year.

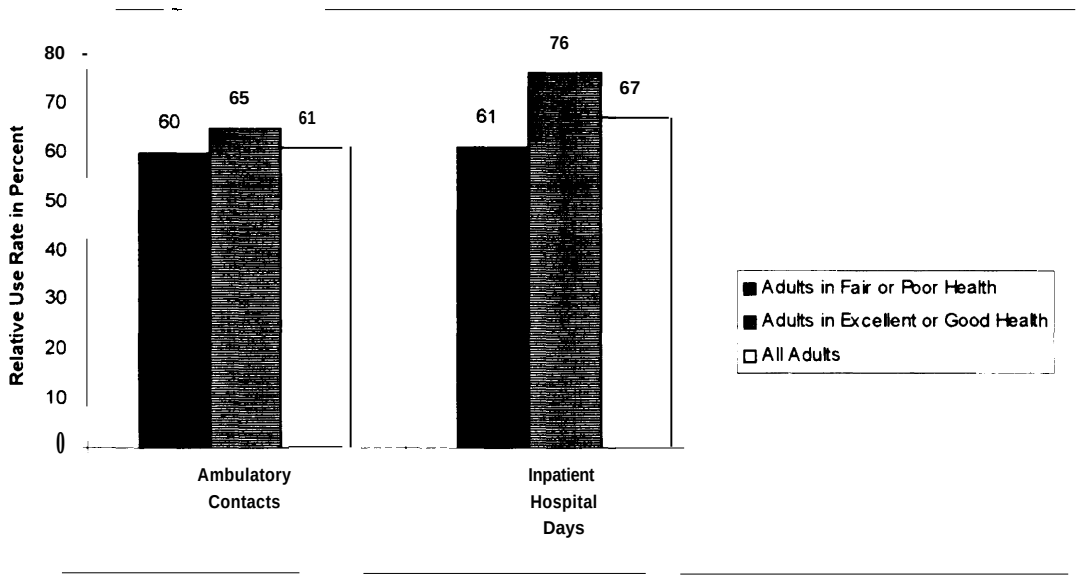
The greater access gap for the uninsured in fair or poor health as compared to healthier adults who lack insurance appears to be due to agreater gap in the likelihood of a hospital admission and not to a greater gap in the likelihood of any ambulatory contact with the health care system during the year.~ That is, the effect of a lack of insurance on the patient's decision to initiate care does not vary by health status. Instead, lack of insurance appears to have a greater effect on the intensity of care -- as measured by the number of ambulatory contacts and referrals for hospitalization -- delivered to less healthy patients who have contact with a medical provider than to healthier adults, This may reflect differences in the way physicians adjust their practice styles to the insurance status of healthy and sick patients, or it may reflect less follow-up of prescribed regimens by the uninsured in poor health who cannot afford to pay for their care.

The access gaps for uninsured children are only slightly smaller than those for adults, as reflected by the somewhat higher relative use rates shown in Figure 2. Uninsured children have about 70 percent of the ambulatory contact that they would be expected to have if insured for the year. On average, uninsured children would have about 1 more ambulatory contact per year if insured (Table 2). This reflects both an increase in the number of children who would receive ambulatory treatment and an increase in the number of contacts by those who receive some treatment. Under universal coverage, about 73 percent of the currently uninsured children would receive medical treatment in the year, up from the current rate of 60 percent. The number of ambulatory contacts for those receiving some treatment would also increase by about 20 percent, to 4.3 contacts per year.

---

[4]See Chapter 3 for details.

FIGURE 2. Health Service Use Rates by Uninsured Children Relative to Expected Insured Use Rates



NOTE: Relative use rates are calculated separately for each group, based on their respective absolute use rates (see Table 2). Therefore. the relative use rate for all children is not a weighted average of those for the two subgroups.

As with adults, lack of insurance has somewhat less effect on relative use of hospital care by children than on use of ambulatory care; the uninsured currently have about 80 percent of the inpatient days that a comparable insured group would have. Uninsured children would average an additional 5 days of inpatient hospital care per 100 children under universal coverage. As with the adults, this additional care would come from an increase in admissions, which we predict would rise by about 33 percent for the uninsured. The average length of stay for the currently uninsured would actually fall under universal coverage, presumably because the incremental admissions are for the treatment of less critical problems,

The pattern of differences between healthy and less healthy uninsured children is similar to that for adults. The gaps are larger for the less healthy children -- who comprise about 8 percent of children who are uninsured for a full year -- and are attributable to larger gaps in the number of ambulatory contacts among those receiving some medical treatment and in hospital admission rates, rather than to larger gaps in the probability of obtaining some ambulatory medical treatment.

TABLE 2. Uninsured Access Gap for Children
Predicted Use Rates for Uninsured Children

Insurance Status of Person	Children in Fair or Poor Health	Children in Excellent or Good Health	All Children
		Ambulatory Contacts Per Person	
Uninsured	3.5	2.1	2.3
Insured	6.4	3.1	3.3
Access gap	-2.9	-1.0	-1.0
Relative use	55%	68%	70%
		Hospital Days Per Person	
Uninsured	0.41	0.19	0.21
Insured	0.84	0.21	0.26
Access gap	-0.43	-0.02	-0.05
Relative use	49%	90%	81%

TOTAL HEALTH RESOURCE USE AND COST UNDER UNIVERSAL COVERAGE

Here we address two important questions that are often asked about health reform proposals that would assure universal health insurance coverage:

- do we have sufficient health resource capacity to serve the added demands of the newly insured?
- how much will it cost to cover all the uninsured?

Increase in Use and Resource Capacity

Table 3 provides estimates of the aggregate access gap, measured in ambulatory contacts and inpatient hospital days, for uninsured adults and children. Stated another way, the estimates reflect nearly all of the added demands that would be placed on our system of health resources under universal health insurance. This is because the measures of ambulatory care and inpatient hospital care that are used in this study comprise nearly all of the health care services that would be covered under national health reform benefit packages. These estimates are based on the predicted access gap for the uninsured, as discussed in the previous section, weighted by the number of "full-year equivalent" uninsured person years in 1992.[5]

[5] 'Uninsured person years are the number of persons uninsured for the full year plus the number of persons uninsured for some part of the year times the proportion of months that they lacked insurance. Our method of estimating the number of uninsured person years is given in Chapter 4.

TABLE 3. Aggregate Access Gap for Uninsured

	Ambulatory Contacts (in millions)	Hospital Days (in millions)
Adults	45.1	5.6
Children	9.8	0.5
Total	54.9	6.1

We estimate that the total ambulatory contacts would rise by 54.9 million. To put this in perspective, it is 3.8 percent of all such contacts in 1991, and many plans would "phase in" the increased coverage over several years during the last half of this decade. To indicate the pressure this would put on physicians' capacity for treatment, between 1990 and 2000 the total number of active physicians is expected to grow by about 20 percent. Because total population is expected to grow by only 7 percent over this same period, there would be plenty of added capacity to absorb the added demand of the newly insured without cutting back on the access to physicians enjoyed at the beginning of the decade.

Turning to inpatient hospital care, 6,1 million added days of care would be sought by the newly insured, 3.6 percent more days of care than provided in 1991 to all patients. Certainly on average, there is ample capacity in the system of short-stay hospitals in the U.S. to handle the added demand, To provide all 6.1 million days of care to the newly insured would have raised the 1991 national occupancy rate by 1,6 percentage points, from 66,3 percent to 67,9 percent.

Of course, showing that the added total use is a small proportion of total capacity is no assurance that all the added demand would be accommodated. It is entirely possible that there would be localized access problems for some of the newly insured.

Increase in Costs

Table 4 shows the estimated value of health resources (in 1993 dollars) that would be consumed by the formerly uninsured, if universal health insurance were fully implemented. This valuation was done by calculating the average payment per unit of service -- that is, the ambulatory care contact and the inpatient hospital day -- across all payers in the health system and multiplying by our aggregate use estimates for the uninsured, both current use and increased use (the latter is shown in Table 3). Of the $60.5 billion total inpatient hospital and ambulatory care resources used by this group, $40.6 billion would have been consumed had they been uninsured, and $19.9 billion of new resources would be required in response to the new insurance. The incremental costs would be about evenly divided between ambulatory care ($10. 1 billion) at all sites -- including physicians' offices, clinics, and hospital outpatient departments -- and inpatient hospital care ($9.8 billion),

This $19.9 billion for increased demand represents a 2.2 percent increase in total national health spending. An intuitive explanation of the size of this proportion follows. The uninsured represent about 15 percent of the total population. Hospital and physician services account for about 60 percent of national health spending on all services.[b] Increased demand accounts for about 33 percent of total use by the newly insured. The product of these proportions (.15x .60x .33 = .03) suggests that increased demand is likely to be about 3 percent of total health spending, a figure consistent with our detailed estimate.

TABLE 4. Resource Cost of Covering the Uninsured
(in billions of 1993 dollars)

Type of Health Service	Current Use	Increased Demand	Total Cost
Ambulatory Care	18.1	10.1	28.2
Inpatient Hospital Care	22.5	9.8	32.3
Total	40.6	19.9	60.5

NOTE: Ambulatory care includes visits at all sites, including physicians' offices, clinics, and hospital outpatient departments.

Our estimates of the uninsured access gap and so of demand that would be induced by universal coverage assume that under universal coverage the currently uninsured would use at the same rate as currently insured individuals with similar economic and demographic characteristics. Other work, however, suggests that the currently uninsured might continue to use at lower rates, hence our estimates may overstate induced demand by as much as 50 percent. ' If this were the case, the added spending under universal coverage would still represent less than a 3 percent increase in national health spending.

A related concept of "cost" is the added flow of insurance premiums that would be associated with moving to universal insurance. The magnitude of total premiums for the newly insured reflects both the transfer of costs for services that would have been consumed by the uninsured (but not financed by insurance) and the costs of increased demand under insurance. The estimated total resource cost of $60.5 billion in Table 4 is approximately the same as the value of new premiums that would be paid. Part of the total value of resources, the cost sharing paid directly by patients, would not appear in the premium, however. But the costs of insurance administration would have to be added to the health care resource costs to calculate a premium. Under our estimates, these adjustments prove to be nearly offsetting, leaving the total unchanged (see Chapter 4 for

[6]Most of the remaining services -- including nursing home services, home health care, and dental and vision care -- would not be covered by typical health reform benefit packages for the newly insured.

'See Chapter 3 for more discussion of this point.

elaboration and supporting evidence). Finally, the premium estimate depends on the details of the benefit package. Under most health reform plans, benefits would also include prescription drugs, Thus, covered benefits could be at least 115 percent of the $60 billion for ambulatory and inpatient hospital services shown in Table 4, or about $70 billion.

CHAPTER 3. HEALTH CARE USE BY THE UNINSURED RELATIVE TO THE INSURED

BACKGROUND

There exists a substantial literature that attempts to measure the access gap between the uninsured and the insured. Tables 5 and 6 summarize results from our review of the research literature of studies that measure the gap using data from one of several major national household surveys: the Survey of Income and Program Participation (SIPP), the Health Interview Survey (HIS), the National Medical Care Expenditure Survey (NMCES), the National Medical Care Utilization and Expenditure Survey (NMCUES), the National Medical Expenditure Survey (NMES), and the Access to Health Care Surveys (ACCESS) sponsored by the Robert Wood Johnson Foundation. The tables report the estimates of relative use by the uninsured for physician and inpatient hospital services, respectively. Each table measures the access gap for the probability of receiving any care and the total quantity of care. The former measure is the ratio of the proportion of uninsured who receive that type of care during the year (or other time period) to the proportion of the insured who receive care. The gap in the quantity of doctor visits is the ratio of the average annual number of hospital days for the uninsured to that for the insured.

Several conclusions can be drawn from the tables. The literature is almost universally consistent in finding that the uninsured receive less care than the insured. The studies also provide some evidence that insurance status affects both the likelihood of receiving care and the intensity of care received by those who do obtain care. Despite these consistent findings, however, the literature yields a very wide range of estimates about the actual magnitude of the access gap. Based on this research literature, the uninsured have between 46 and 100 percent as many physician visits as the insured, and between 12 and 81 percent as many inpatient hospital services.

This variation among the studies could result from a variety of causes, including:

- changes in relative use over time reflected in data from different years,
- different populations or different control variables in the analysis,
- different definitions of health care use,
- different definitions of insurance and lack of it, and
- different data collection methods among the surveys.

TABLE 5. Measures of Use of Ambulatory Care by Uninsured Relative to Insured

REFERENCE	SURVEY DATA	POPULATION	INSURANCE	NET/TOTAI.	ESTIMATES OF RELATIVE USE (IN PERCENT PROB. VISIT	NUMBER VISITS
CURRENT INSURANCE/LAST YEAR UTILIZATION						
Yeclin et al., (1983)	1976 HIS	All persons	Private/public	Net		N.S.
	1976 HIS	Sick persons	Private/public	Net	--	> 100
Berk et al.. (1983)	1977 NMCES	All persons	Private	Net	87	95
	1977 NMCES	All persons	Public	Net	88	70
Aday and Anderson (1984)	1982 Access	All persons	Private	Total	82	--
	1982 Access	All persons	public	Total	79	--
Freeman et al. (1987)	1982 Access	Under 65	Private/public	Total	--	81
Chen and Lyttle (1 987)	1982 Access	Under 65	Private	Net	91	91
	1982 Access	Under 65	Public	Net	89	88
Woodhandler and Himmelstein (1988)	1982 HIS	Women 45-64	Private/public	Total	78-92(a)	--
	1982 HIS	Women 45-64	Private/public	Net	88-95(a)	-.
Anderson et al., (1 987)	1984 HIS	All persons	Private/puhlic	Total	80	--
Rowland and Lyons (1989)	1984 HIS	<65, low income	Private	Total	80	79
	1984 HIS	<65, low income	Private	Net	71	46
Long and Rodgers (1990)	1984 SIPP	Adults <65	Private	Net	82	72
Freeman et al., (1987)	1986 Access	Under 65	Private/public	Total	--	73
Hayward et al., (1988)	1986 Access	Age >21, <65	Private/public	Total	86	--
Long and Rodgers (1990)	1986 HIS	Adults <65	Private	Net	--	75
LAST YEAR INSURANCE/LAST YEAR UTILIZATION						
Davis and Rowland (1983)	1977 NMCES	Under 65	Private/puhlic	Total	--	65
	1977 NMCES	Under 65	Private/pubic	Net	-.	60
Wilensky and Berk (1982)	1977 NMCES	Poor/nearpoor	Private (b)	Total	78	68
	1977 NMCES	Poor/ nearpoor	Private (b)	Net		53-65(c)
	977 NMCES	Poor/ nearpoor	Public	Total	72	46
	977 NMCES	Poor/nearpoor	Public	Net	-.	57-65(c)
Rosenbach (1989)	980 NMCUES	<18, poor	Private (b)	Net	91	86
	980 NMCUES	<18, poor	Public (d)	Net	86	85
Long and Rodgers (1990)	984 SIPP	Adults <65	Private	Net	75	63
Short and Lefkowitz (1992)	987 NMES	Children <5	Private	Total	88	--

REFERENCE	SURVEY DATA	POPULATION	INSURANCE	NET/TOTAL	ESTIMATES OF RELATIVE USE (IN PERCENT) PROB. VISIT	NUMBER VISITS
	987 NMES	Children < 5	Private	Net	85 (well visit)	--
	1987 NMES	Children < 5	Public	Total	98	--
	1987 NMES	Children < 5	Private	Net	73 (we l visit)	--
Spillman (1992)	1980 NMCUES	Males 17-64	Private	Net	71	48
	1980 NMCUES	Females 17-64	Private	Net	79	55
	1980 NMCUES	Children < 17	Private	Net	86	71
LAST MONTH INSURANCE/LAST MONTH USE						
Long and Settle (1985)	1980 NMCUES	Under 65, poor	Private	Net	68	-
	1980 NMCUES	Under 65, poor	Public	Net	62	-

n.s. not significant
(a) screening procedures: hypertension, pap test, breast exam, glaucoma.
(b) includes part year private.
(c) three poor health status groups: those with more than 8 bed days; in poor or fair heal h; health limits activities.
(d) includes part year public.

TABLE 6. Measures of Use of Hospital Care by Uninsured Relative to Insured

REFERENCE	SURVEY DATA	POPULATION	INSURANCE	NET/TOTAL	ESTIMATES OF RELATIVE USE (IN PERCENT) PROB. ADMIT	NUMBER DAYS
CURRENT INSURANCE/LAST YEAR UTILIZATION						
Aday and Anderson (1984)	1982 Access	All persons	Private	Total	67	
	1982 Access	All persons	Public	Total	35	
Freeman et al. (1987)	1982 Access	Under 65	Private/public	Total	61	--
Chen and Lyttle (1987)	1982 Access	Under 65	Private	Net	59	59
	1982 Access	Under 65	Public	Net	50	50
Anderson et al. (987)	1984 HIS	All persons	Private/public	Total	69	
Rowland and Lyons (989)	984 HIS	<65, low income	Private	Total	73	
	1984 HIS	<65, low income	Public	Total	50	
Long and Rodgers (1990)	1984 SIPP	Adults <65	Private	Net	63	56
Freeman et al. (1987)	1986 Access	Under 65	Private/public	Total	81	--
Long and Rodgers (990)	1986 HIS	Adults <65	Private	Net	--	63
LAST YEAR INSURANCE/LAST YEAR UTILIZATION						
Davis and Rowland (1993)	1977 NMCES	Under 65	Private/public	Total		53
Wilensky and Berk (1982)	1977 NMCES	Poor/nearpoor	Private (a)	Total		55
	1977 NMCES	Poor/nearpoor	Private (a)	Net		39-62 (b)
	977 NMCES	Poor/nearpoor	Public	Total		35
	1977 NMCES	Poor/nearpoor	Public	Net		47-68 (b)
Long and Rodgers (1990)	1984 SIPP	Adults <65	Private	Net	46	31
Spillman (1992)	1980 NMCUES	Males 17-64	Private	Net	26	12
	1980 NMCUES	Females 17-64	Private	Net	30	20
	1980 NMCUES	Children <17	Private	Net	25	--
LAST MONTH INSURANCE/LAST MONTH USE						
Long and Settle (985)	1980 NMCUES	Under 65, poor	Private	Net	33	
	1980 NMCUES	Under 65, poor	Public	Net	30	

(a) Includes part year private.

(b) Three poor health status groups: those with more than 8 bed days; in poor or fair health; health limits activities.

We do not have enough data points in the published studies to factor out these disparate causes; that is, we do not have studies that differ from each other in only one of these factors and so the effects of the different causes are confounded, However, narrowing the estimate of the access gap is important because the true difference in relative use among the groups has important implications in terms of the numbers of the uninsured who receive health care and the cost of health care reforms to equalize coverage for the insured and uninsured. For example, the range in the measure of the access gap of seeing a physician from 62 percent to 98 percent implies a difference of 9.4 million additional currently uninsured individuals who would contact a physician under health reform which guaranteed universal coverage. The range in the access gap for the probability of a hospital admission from 25 percent to 81 percent is a difference of 2.1 million additional hospital admissions for the currently uninsured under reform.

One purpose of this study is to obtain a more precise estimate of the gap and evaluate the causes of the disparate estimates that we observe. To do this, we analyze a number of the databases that have been used by the studies shown in Tables 5 and 6, applying standard definitions and methods to each. We do find changes overtime in the ambulatory gap and differences in the gap between healthy and less healthy persons that might be a source of discrepancies in the literature.

DATA AND METHODS

Data

The databases that we use in our analysis include the 1987 National Medical Expenditure Survey, the Survey of Income and Program Participation for the years 1984 through 1988, and the Health Interview Survey for the years 1980, 1083, 1984, 1986, and 1989.[8] We have included a time series from the SIPP and HIS to test our hypothesis that a change in the access gap over time might be a source of the different estimates that are found in the literature. The large sample sizes from the time series also facilitate more precise estimates of the utilization behavior of the uninsured, particularly for inpatient hospital services, than would be obtained from only one year's sample. All three surveys are administered to a representative sample of the American population and collect information about each person's health, health care use, insurance status, and economic and demographic characteristics. We restrict our analysis to persons who are age 64 or younger at the time of the survey.[9]

We examine four different measures of health care use: the probability of having an ambulatory care contact with a medical provider in a year, including a visit to a doctor's office, a clinic, or hospital emergency room and telephone contacts; the number of such

---

[8]These years of the HIS were selected because the survey included questions about health insurance coverage, our key explanatory variable.

[9]Data about health and health care use in the SIPP are collected in a special supplement that is administered only to adults. Therefore. our analyses of the SIPP data are restricted to persons age 18 to 64.

contacts; the probability of having a hospital admission during the year; the total number of hospital days of care in a year.

In this paper, we focus on differences in use between those who are uninsured and those who have private employer group insurance coverage. Our estimate of increased use and the consequent cost of health reform is based on the access gap in use by the uninsured relative to what they would use if covered by the same mix of plans and benefits held by those presently covered by employer-sponsored benefit plans. Although we do not have details about the generosity of benefits provided to those who are insured in our sample, other analyses have shown that there is limited variation among employer-sponsored plans. For example, the premium for the plan at the lowest tenth percentile of employer plans when ranked on generosity is only about 20 percent lower than the median plan, and the plan at the ninetieth percentile has a premium only about 20 percent above the median.

The SIPP and NMES are both panel studies that provide information about health insurance coverage over the full course of the year for which health care use is measured. Our measure of the uninsured access gap in these studies is based on a contrast between those who were uninsured for the full year and those who were covered by employer group coverage for the full year, We do include other insurance groups in our analysis sample and our estimation models, differentiating among the groups using indicator variable (O, 1 variables) to designate the group to which the individual belongs. The other groups include those on Medicaid for a full year, those with individually purchased private insurance policies that were in force for the full year, those uninsured for part of the year and with employer coverage for part of the year, and those uninsured for part of the year and on Medicaid for part of the year. 10

In contrast, the HIS collects information about insurance only at the time of the interview. Because individuals move into and out of the state of being uninsured, a contrast of use in the past year by those currently uninsured and those currently covered by an employer group plan will likely understate the access gap based on the measures of insurance status over the full year (Long and Rodgers, 1990). This was one of the factors we hypothesized above might have produced the discrepant estimates of the access gap that we find in the literature. We test this by contrasting the estimates of the access gap based on the full year measure in the NMES and SIPP with the access gap based on current insurance measured in all three of our surveys. Our HIS analysis sample includes persons who were uninsured at the time of the survey, covered by an employer group plan, covered by an individually purchased plan, or covered by Medicaid, with insurance status indicator variables to distinguish among the groups, [11] Because the HIS is a very large

---

[10] We exclude those who are covered by both Medicaid and private coverage at any one time, those covered by Medicare, CHAMPUS, or other Department of Defense (DoD) insurance. and those who have other combinations of coverage over time that are not included in the list above. These groups are excluded because they comprise only about 15 percent of the population in total and so we have too few observations in any one of these categories to reliably estimate the effect of these status categories.

[11] Again, we exclude those on Medicare. CHAMPUS, or other DoD benefit plans. and those who are covered by more than one source at a given time.

survey and because we are studying multiple years of data, we have sampled from the full database for our analyses. For adults, we randomly selected from each year a 20 percent sample of those covered by employer group policies, a 50 percent sample of those uninsured or with individually purchased policies, and the full sample of cases with other insurance status. For children, our sample includes a random selection of 30 percent of those with employer group coverage in each year and all of the children in each of the remaining insurance groups.

The SIPP sample that we analyze includes all adults who completed all waves of their panel and the NMES sample includes all persons under age 65 who completed that full panel. We require data from all waves of the SIPP and NMES panels to construct the measure of insurance throughout the year. Requiring the full year of data, however means that newborns are not in our estimation sample. This exclusion does not bias our estimate of the access gap, if the effect of insurance status on the quantity of services consumed does not differ for newborns and other children.[13] Our final analysis sample sizes for each of the databases are shown in Table 7.

Statistical Methods

We use multivariate regression to estimate the relationship between insurance status and health care use. For each type of use -- ambulatory care and inpatient hospital care -- we fit a two-part model of use. The first part of each model is a logic regression for the probability of receiving that type of care during the year. Thus, this equation separates users from non-users. The second equation is a linear regression for the logarithm for the total quantity of care for the users of the service -- the number of ambulatory visits for those who have at least one visit and the number of inpatient hospital days for those with an admission. Two characteristics of the distribution of medical care use lead to this type of model. The first is that there are many individuals with no use in a year. Distinguishing between the decision to use and the quantity of use for those who do have care deals with this problem. The second characteristic is that the distribution of visits and days among users is highly skewed, and therefore we use the logarithmic transformation in the second part of each model to reduce the skewness and provide more efficient parameter estimates.

TABLE 7. Analysis Sample Sizes

Survey	Adults	Children
SIPP (1984-1988)	54,198	--
HIS (1980, 83, 84, 86, 89)	74,895	61,122
NMES (1987)	13,196	6,329

[12] For the analysis of the number of hospital days for people with a hospital admission, however, we have used the full HIS sample in each year.

3also omits those who die during a year. However, since we restrict our analysis to those under 65, this is a small omission for the purpose of gap analysis.

We fit separate utilization models for adults (those age 18 to 64) and for children. Each of our models includes covariates for age, sex, race and ethnicity, income as a percent of poverty, urban vs. rural area, and health status. Indicators to capture time trends (specified as a 0,1 variable for each year in the time series) are included in the models fit to thc pooled time-series for the HIS and SIPP. The models include indicator variables to indicate insurance status: full year coverage under employer-plan, full year coverage under Medicaid, full year coverage under individually purchased coverage, and combinations of part-year insurance and uninsurance. The omitted category is for those who are uninsured for the full year. Thus, our equations contrast the full-year uninsured with individuals in other insurance status groups. Our predictions of the access gap, described below, are based on the contrasts of the full-year uninsured and those who have a full year of coverage under an employer group plan. We also test for some important interactions between insurance status and covariates to investigate whether the gap in use between the insured and uninsured differs among certain population groups, especially groups differing in health status and income, and whether the gap has been changing over time.

We use the fitted model on each data set to estimate health care use for each member of the uninsured population and to predict or simulate what each person's use would be if he or she were covered by a plan typical of those covering persons with employer group coverage. To simulate use for the uninsured in this way requires an input or prediction database of individuals with the characteristics of the uninsured. [15] We use the NMES sample of uninsured persons as our input database in predicting from each fitted model. [16] That is, we predict for a standard population using each of our fitted utilization models in order to compare the results from the models. The average values of the NMES uninsured sample for the individual characteristics in our regression models are given in Table 8.

The difference in the predicted current use for the uninsured averaged over our prediction sample and the average predicted use for that sample if they were insured is our measure of the uninsured access gap. This measures the marginal effect of insurance; that is, the effect of changing insurance status but holding other characteristics constant.

We also report predicted values to investigate whether the access gap has changed over time or differs for some subgroups of the uninsured. In these predicted values, we simulate use for the sample of the uninsured as if they all belonged to the subgroup under study. For example, to investigate whether the access gap differs for those in good health and in poor health, we predict the gap for the uninsured sample as if they all reported that

---

[14]Contrasts of the uninsured and other insurance status groups are available from the authors.

15Because our model is nonlinear. we require data about individuals rather than statistics on the average value of the characteristic for the population of interest: the predicted value for an individual with average characteristics differs from the average predicted value over all individuals due to nonlinearity.

16We selected the NMES as our prediction sample because it provides data for both adults and children who are uninsured and because it provides data on an expanded set of health status measures needed to evaluate the effects of using different control variables on estimates of the access gap as we discuss below.

they were in good health and compare this to the magnitude of the gap that we would expect if the uninsured sample all reported to be in poor health. This measures the marginal effect of health on the access gap, controlling for other characteristics that differ between healthy and less healthy uninsured individuals.

Some studies in the research literature reported earlier use observed differences between an uninsured and insured population as a measure of the access gap. This difference measures the total effect of being uninsured baking account of both insurance status and other characteristics that vary by insurance status. We also calculate the total effect of being uninsured to examine whether the marginal and total effect differ and might be a factor in the discrepant results that we have found in the research literature. We measure the total effect as the difference in the average predicted value for the uninsured with the average predicted value for the sample of individuals in NMES who have employer group insurance.

TABLE 8. Average Values on Individual Characteristics in Models for Prediction (NMES) Sample

	Adults		Children	
Model Characteristics	Uninsured	Insured	Uninsured	Insured
Education			NA	NA
Less high school	39%	15%		
Complete high school	40	38		
Some college	15	22		
Complete college	3	14		
Age and Sex Adult			NA	NA
Male 25-44	29	28		
Male 45-54	5	9		
Male 55-64	6	8		
Female 18-24	12	7		
Female 25-44	20	27		
Female 45-54	7	8		
Female 55-64	7	8		
Age Child	NA	NA		
Less than 6			29%	29%
6-14			51	53
Male child	NA	NA	51	51
Family Income as %-Poverty				
Less than 100%	32	3	52	6
100-200%	32	10	29	17
200-400%	25	38	15	48
Not married	59	31	NA	NA
Race/ethnicity				
Hispanic	34	13	41	14
Black (not Hispanic)	18	8	19	9
Asian	2	2	1	2
Other non-white	3	1	3	2
Reported health status				
Good	56	56	48	42
Fair	17	10	7	4
Poor	3	1	1	[a]
Gave birth in year	1	2	NA	NA
Lives in urban area	71	78	68	74

NOTE: NA =not applicable. Omitted indicators include excellent or very good health; white: family income 400% of poverty or more; male 18-24; post college education (adult): and age 15-17 (children).

[a]less than 0.5 percent

The predicted value of ambulatory contacts or of inpatient days for a sample person in our prediction database from one of the fitted models is given by:

$$\text{Predicted Use} = P\,(\exp(X\beta))\,S,$$

where P is the estimated probability of having some use from the logistic regression, (exp(Xß)) S is the estimate of the conditional quantity of care consumed, XB is the product of the B coefficients from the regression on the logarithm of quantity and the value of the individual's X characteristics, and S is a factor to retransform from the logarithmic scale to the raw quantity scale. Our retransformation factor is a nonparametric estimate developed by Duan (1982) and is equal to the sample average of the exponentiated least squares residuals. We use the nonparametric factor because the error in our quantity of use regressions does deviate some from a normal distribution, even though we applied the logarithmic transformation to approximate a normal distribution. Therefore, using the normal theory retransformation would yield inconsistent predictions. We also found that the distribution of the errors in the quantity of use equation differ by insurance status, and so have estimated and applied separate retransformation factors, S, by insurance status to account for heteroskedasticity (that is, differences in the distribution of errors).

RESULTS

This section describes the results of our estimation. We first consider several factors that we hypothesized might account for the discrepant estimates in the literature -- temporal changes, sample selection and control variables, definitions of insurance status, and the definition of use. Then we present our estimates of the gap from the different data sources, correcting for the most important of these factors.

Effects of Time on the Access Gap

Our estimate of the change in the uninsured access gap over time from our analysis of the time series of SIPP and HIS data is shown in Table 9. The table compares the predicted access gap for the most recent year for which we had survey data and for 1984 (which was the earliest year we studied that was common to both studies). The measure shown in the table is the predicted average difference for the year shown in actual use and simulated use with employer group coverage for the uninsured population. The t-statistic in the table tests whether this access gap has changed over time. A negative t-statistic shows that a negative effect on use of being uninsured has increased over time whereas a positive t-statistic shows that this gap has decreased. In the case of the length of hospital stay for those with an admission, we typically find that the uninsured have a longer stay than the insured -- perhaps because the uninsured are less likely to be admitted to the hospital and so those who are admitted have more serious health problems than those insured who have admissions, When the "gap" is positive, a negative t-statistic indicates that the difference has diminished over time and a positive t-statistic that it has increased,

TABLE 9. Difference in Health Services Access Gap Over Time

Data Source and Year	Ambulatory Contacts			Hospital Days		
	Gap in Probability of Use (in percent)	Gap in Contacts per User	Gap in Contacts per Person	Gap in Probability of Use (in percent)	Gap in Days per User	Gap in Days per Person
			Adults			
SIPP						
1988	-17%	-0.6	-1.2	-2%	1.4	-0.07
1984	-14	-0.6	-1.O	-4	1.1	-0,35
t difference	-1.7	0.1	-0.8	2.0’	0.3	1.6
HIS						
1989	-14	-0.5	-1,0	-3	0.4	-0.19
1984	-12	-0.1	-0.6	-3	0.7	-0.20
t difference	-3.3	-4,4’	-4.8’	-0.8	-1.1	0.8
			Children			
HIS						
1989	-11	-0.6	-0.8	-1	-0.7	-0.05
1984	-9	-0.4	-0.6	-1	0.7	-0.06
t difference	-2.5	-3.4	-4. l[a]	0.4	-(). 1	(). 1

‘Significantly different gap at p=. 10.

The estimates for adults and children show a consistent pattern of an increase in the access gap over time in the probability of obtaining ambulatory care. The proportion of the uninsured who do not obtain care because of the lack of insurance has increased about 2 to 3 percentage points between the mid-1980s and the late 1980s. The different data sets in our time series analysis, however, produce different findings about the effect of time on the quantity of ambulatory care delivered to those who obtain some care (contacts per user in Table 9). The SIPP data suggest that there is a small decrease in the access gap in the quantity of care delivered to those who have at least one ambulatory contact. This offsets to some degree the increased gap in the likelihood of use and so there is only a small increase over time in the gap in the number of contacts averaged over all persons -- both users and nonusers of care (contacts per person in Table 9). This would be consistent with the hypothesis that the relative increase in the proportion of the uninsured who do not obtain care is among those with less severe health problems and so the average sickliness of the uninsured who contact a provider has increased relative to the insured. In the HIS data, however, the gap in the amount of ambulatory care received by the insured and uninsured who obtain care has also increased, adding further to the total access gap in ambulatory contacts across all persons.

The access gap in hospital care, in contrast, appears not to have changed over time. We do not find consistent nor, in general, significant changes in the gap between the insured and uninsured between the two time periods. this is not to say that hospital use has not changed over the period. Indeed, both data sets evidenced that hospital lengths of stay for those with an admission decreased about 10 percent from 1984 to the late 1980s. But the decrease occurred among both the insured with admissions and the uninsured with admissions, and there was no discernible change in the access gap.

Effects of Patient Characteristics on the Access Gap

Some of the research studies look at special population groups such as the poor or those in poor health. If the access gap differs among population groups, this might be a factor accounting for the variation in the estimates of the access gap. We investigated whether there is an interaction between these patient characteristics and use. Below wc look at whether the access gap differs by income and by health status -- that is, whether there is a significant interaction between income or health and being insured on use of services relative to use by the uninsured, We report the marginal effects of each characteristic on the access gap, controlling for other differences in demographic, economic, and health factors that distinguish between low and high income or healthy and sickly individuals.

Family income. One might expect that the lack of insurance would be less of a barrier to receiving care for higher income families than for lower income families. However, among children, our analysis shows that the gap in the probability of ambulatory care for the uninsured in families with income above 200 percent of poverty (who account for a little more than 1/5 of children who are uninsured) is greater than the gap for the uninsured in families with income below poverty (who account for about 2/5 of the uninsured children). Similarly, the gap in the quantity of use is greater between the uninsured and insured children in families with higher income than for those with lower income (Table 10).

One possible explanation for this finding is that we have not controlled for the level of insurance coverage. The larger gap among the higher income children may indicate that the high income insured have more generous insurance coverage than the lower income insured, Another possible explanation is that most employer group coverage currently includes an initial deductible that must be paid by the family before the health insurance pays a share of benefits. A deductible maybe more of a constraint to access for the low income insured than the high income insured. This would be especially consistent with our finding that the lack of insurance has a much smaller effect on the likelihood of having any ambulatory contact among low income families than among higher income families. A third possible explanation is that the availability of free or subsidized care -- for example, through health department clinics, community health centers, and public hospital outpatient departments -- is greater the neighborhoods of the lower income uninsured,

Although our results do control for self-reported differences in health status between income groups, a fourth explanation for the larger gap for higher income uninsured families may be that these families have information about their health needs that we do not measure and choose not to purchase insurance because they know they will not use services. This hypothesis suggests that self-selection accounts for the larger gap, Although there are statistically significant differences in the access gap by income group for children, the effect of these differences on the estimate of the overall gap is small, The "best estimate" of the average access gap based on a model that includes the interaction of income and insurance is 0,8 visits per person per year in contrast to a "best estimate" of 1 visit based on a model that does not specify the interaction. 17

For adults, we do not find consistent evidence of a difference in the access gap for the uninsured with income below poverty (who account for about 1/4 of the uninsured adults) and those with income above 200 percent of poverty (who account for about 40 percent of the uninsured adults), Only the HIS data set suggests that there is a significantly different access gap for the two groups. The other two data sets show access gaps that are of similar magnitude for low and high income uninsured. The "best estimate" of the overall average access gap in ambulatory care for adults is only 0.1 visits (about 5 percent) lower when we account for differences by income group than the estimate that assumes the access gap is the same for the different uninsured groups.

---

[17]0ur "best estimate" is the average estimate from the different sources. The "best estimate" methods are discussed below.

TABLE 10. Difference In Access Gap for Uninsured by Income
(Marginal Effects)

Data Source and Income	Ambulatory Contacts			Hospital Days		
	Gap in Probability of use **(in percent)**	Gap in **Contacts** Per **User**	Gap in Contacts Per **Person**	Gap in Probability of Use **(in percent)**	**Gap** in **Days Per user**	Gap in Days **Per Person**
			Adult,			
SIPP						
Below poverty	-15%	-0.9	-1.3	-4%	1.4	-0.20
Above 200% poverty	-14	-0.9	**-1.4**	**-5**	1.5	-0.25
t difference	-0.2	0.1	0.3	**0.8**	-0.2	0.7
NMES						
Below poverty	-17	**-2.1**	**-2.4**	**-4**	-2.0	-0.53
Above 200% poverty	-21	-1.3	**-2.1**	**-2**	0.3	-0.16
t difference	1.4	-1.1	-0.5	**-0.8**	-0.9	1.2
HIS						
Below poverty	-lo	0.4	-0.2	**-3**	0.9	-0.11
Above 200% poverty	-14	-0.4	-1.0	**-3**	0.6	-0.21
t difference	**3.8'**	4.0'	**5.** l[a]	1.1	1.1	1.4
			Children			
NMES						
Below poverty	-4	-0.4	-0.4	-1	**1.5**	-0.01
Above 200% poverty	-13	-1.1	-1.4	**-2**	0.5	-0.02
t difference	2. l[a]	1.0	**1.8a**	0.3	0.9	0.2
HIS						
Below poverty	**-4**	-0.1	-0.1	-1	0.9	-0.02
Above 200% poverty	**-14**	**-0.8**	-1.1	-1	0.8	-0.05
t difference	**8.3'**	**6.7**[a]	**9. l**[a]	0.5	0.3	0.6

'Significantly different gap at p=. 10.

We do not find significant effects of income on the difference in use of inpatient hospital care by the insured and uninsured, Moreover, there is no consistent pattern of difference by income. We conclude that income differences in the access gap are not an important factor accounting for the range of estimates of relative hospital use found in the literature,

Health Status. About 20 percent of uninsured adults and 7 percent of uninsured children report that their health is fair or poor. The gap between use of health care by less healthy uninsured individuals and otherwise similar insured adults is greater than the access gap for healthier individuals. This is shown in Table 11, which gives the marginal effect of differences in health status on the access gap. It contrasts the predicted access gap for the uninsured population if all reported to be in good health with the predicted gap if all report fair health. That is, the difference in the predicted access gap for the different health groups holds other characteristics constant across the groups. The greater access gap for the uninsured in fair health as compared to healthier individuals who lack insurance is primarily due to a greater gap in the number of ambulatory visits per user and in hospital admission rates and not to a greater gap in the likelihood of some contact with the health care system during the year. Except for the SIPP database, the difference in the gap in the probability of use between those in good and fair health among adults is very small and not significant. For children, the point estimates of this difference suggest a smaller gap in the probability of ambulatory use for those in fair health, though the differences are not statistically significant. In contrast, we find generally significant and substantially larger differences between the insured and uninsured in fair health in the number of ambulatory contacts than we see for those in good health. Although we did not find significant differences by health status in the gap in the probability of admission, we do see that the gap is consistently and substantially larger for those in fair health.

In sum, the data suggest that the effect of a lack of insurance on the patient decision to initiate care does not vary by health status. However, lack of insurance appears to have a greater effect on the intensity of care -- as measured by the number of visits and referrals for hospitalization -- delivered to less healthy patients who do contact a medical provider than to healthier adults. This may reflect differences in the way physicians adjust their practice styles to the insurance status of healthy and sicker patients, or it may reflect less follow-up of prescribed regimens by the uninsured in poor health who cannot afford to pay for their care.

TABLE 11. Difference in Access Gap for Uninsured **in** Good Health and Fair Health (Marginal Effects

Data Source and Health Status	Ambulatory Contacts			Hospital Days		
	Gap in Probability of Use (in percent)	**Gap in Contacts Per User**	**Gap in Contacts Per Person**	**Gap in Probability of Use (in percent)**	**Gap in Days Per User**	**Gap in Days Per Person**
			Adults			
SIPP						
Fair health	**-19%**	-1.8	**-2.6**	**-7%**	**1.4**	-0.46
Good health	**-17**	-0.2	-0.7	-1	0.9	-0.04
t difference	**-2.8'**	-3.6'	-4.4'	**-2.** l[a]	0.8	-1 .8'
NMES						
Fair health	-20	**-2.8**	**-3.5**	**-7**	-0.3	**-0.49**
Good health	-20	**-1.3**	-2.0	**-2**	0.6	**-0.07**
t difference	-0.7	**-1.1**	-1.4	-1.2	-0.2	**-1.1**
HIS						
Fair health	-11	**-1.2**	-1.8	**-6**	-0.4	**-0.47**
Good health	-14	0.3	-0.7	**-2**	-0.1	**-0.14**
t difference	0.2	**-2.0'**	-1 .7'	-1.3	-0.5	**-1.0**
			Children			
NMES						
Fair health	-8	-3.9	-3.5	-5	-1.6	-0.39
Good health	-12	-0.6	-0.9	-2	-1.9	-0.04
t difference	0.4	-2. l[a]	-1.0	-0.8	0.8	-1.2
HIS						
Fair health	-4	-2.5	-2.4	-6	-1.1	-0.52
Good health	-11	-0.4	-0.6	-1	0.8	-0.01
t difference	1.0	-3.0[a]	-1.8[a]	-0.7	-1.8[a]	-1.6

[a]Significantly different gap at $p = .1^n$.

Control Variables and Estimates of the Access Gap

Total vs. **marginal effects.** Some studies in the research literature compare actual health care use by the insured and the uninsured to measure the access gap, This reflects any differences between the insured and uninsured in demographic, economic, or health characteristics that influence service use as well as the differences in use due to insurance -- it measures the *total effect* associated with insurance, The total effect reflects differences between the insured and uninsured in the resources currently consumed. Others, as is our practice, measure the gap by comparing health service use by the uninsured with what a population with the same characteristics could be expected to use if they were insured. That is, we control and adjust for differences in the economic and demographic characteristics of those who are observed to be insured and uninsured in measuring the gap -- this is the *marginal @feet* of insurance, The marginal effect reflects the change in the resources the uninsured would consume if insured.

As Table 12 illustrates, the marginal effects of insurance on ambulatory use, controlling for other characteristics that influence use, are smaller than the total effect. For adults the difference is due primarily to a difference in the probability of having a contact whereas for children the marginal effect of having an ambulatory care visit and the conditional number of visits are both smaller than the corresponding total effect. These differences reflect the lower income and education (for adults) of the uninsured, both characteristics that also influence health care use and are controlled for in estimating marginal effects but not total effects (see Table 8).

For adults, the marginal effect of insurance on hospital days per year is greater than the total effect, This is because a smaller proportion of admissions among the uninsured are for deliveries, which have a lower than average length of stay.

Health status control variables. Our estimates of the access gap control for a number of important observed characteristics of individuals that affect decisions about health care use. However, there may be unobserved differences between the insured and uninsured that we cannot control for. Our estimates of the health care costs of reform assume that these unobserved factors do not affect health care use. lf these unobserved factors are differences in health, however, such an assumption may be too strong. We have included a measure of health status in our estimation models; however, it is a fairly simple rating of the individual's health, which may not adequately capture all health differences.[18]

[1g]The variable we have used in our models is a measure of whether the individual rates his or her health excellent, very good, good. fair, or poor. In the NMES, the categories are limited to excellent. good, fair, or poor.

TABLE 12. Difference in Marginal and Total Effects of Insurance

Data Source and Type of Effect	Ambulatory Contacts			Hospital Days		
	Gap in Probability of Use (in percent)	Gap in Contacts Per User	Gap in Contacts Per Person	Gap in Probability of Use (in percent)	Gap in Days Per User	Gap in Days Per Person
			Adults			
SIPP						
Marginal effect	-17%	-0.6	-1.2	-3%	1.2	-0.16
Total effect	-25	-0.6	-1.5	-3	1.4	-0.12
NMES						
Marginal effect	-20	-1.6	-2.2	-3	-0.2	-0.24
Total effect	-26	-2.0	-2.8	-3	0.1	-0.14
HIS						
Marginal effect	-14	-0.5	-1.0	-3	0.7	-0.15
Total effect	-18	-0.4	-1.1	-2	0.9	-0.06
			Children			
NMES						
Marginal effect	-12	-0.8	-1.1	-2	1.9	-0.02
Total effect	-20	-1.6	-2.0	-1	1.9	-0.01
HIS						
Marginal effect	-1o	-0.6	-0.6	-1	0.7	-0.04
Total effect	-18	-0.7	-0.8	-1	1.1	0.02

See p. 29 for definitions of “marginal” and “total” effect.

The NMES database, however, includes a much richer set of health variables that allows us to investigate how sensitive the estimate of the access gap is to the use of only a simple measure of health status versus a more comprehensive characterization of health differences, Table 13 shows the results, It compares the estimate of the access gap from the NMES database including the single health status variable in our model with estimates that also include a measure of whether the individual is limited in any way in his or her activities because of health, a measure of the individual's general perception of his or her health based on 4 questionnaire items (3 for children) and, for adults, a measure of mental health based on 5 questionnaire items, As Table 13 indicates, our measure of the access gap for ambulatory care controlling for the simple health rating may overstate the gap by about 10 percent for both adults and children. The estimated gap in the probability of having ambulatory care and in the number of contacts by those who have at least one is smaller when we control for the richer set of health measures. For hospital days, however, the estimated gap is slightly higher when we include the additional health measures as control variables, Since the effects work in opposite ways on our estimates of total cost described below, on balance our estimate of induced demand and the cost of universal coverage is probably not seriously biased by unobservable health differences between the insured and uninsured.

Effect of **Insurance Definition on** the Access Gap

In many surveys, insurance is measured at the time of the interview, and estimates of the access gap compare use over the preceding year by those who are uninsured at that time with those who are insured at that time. Such is the case with the HIS database. In other surveys insurance corresponds to the period of use, or can be constructed to do so. Such is the case with the SIPP and NMES data in which we measure the access gap as the difference in use among those who were and were not insured over the full year period. Because people move into and out of the state of being uninsured, the first approach is likely to understate the access gap. A comparison of the studies reviewed in the earlier Tables 5 and 6 seems to support this hypothesis. The median relative use estimate for number of physician visits for those studies using a current insurance measure is 77 percent, compared to 64 percent using an annual insurance measure. The corresponding medians from the hospital days estimates are 58 to 43 percent.

A comparison of our estimates based on the HIS with those based on the SIPP and NMES also seem to support this (see Table 12). The HIS estimates of the access gap for ambulatory care are consistently lower than the estimates from the other two databases. The hospital results, however, do not provide this consistent finding.

A more direct test of the effect of insurance definition, however, can be made by comparing the estimates of the access gap in the NMES and SIPP using the alternative insurance definitions, since both databases allow us to construct a measure of current insurance in addition to the measure of last year's insurance. To evaluate the effect of insurance definition, we re-estimate our utilization models using a measure of current insurance and compare the predicted insured and uninsured use rates from the models with the different insurance definitions. Thus, we control for population characteristics and methodological differences between surveys in the comparison.

TABLE 13. Difference in Estimated Access Gap for Uninsured with Controls for Health Status in NMES

Health Controls	Ambulatory Contacts			Hospital Days		
	Gap in Probability of Use (in percent)	Gap in Contacts per User	Gap in Contacts per Person	Gap in Probability of Use (in percent)	Gap in Contacts per User	Gap in Contacts per Person
			Adults			
Limited set	-20%	-1.6	-2.2	-3%	-0.2	-0.24
Expanded set	-19	-1.4	-2.0	-3	-0.4	**-0.26**
			Children			
Limited set	-12	-0.8	-1.1	-1	1.9	0.03
Expanded set	-14	-0.6	-1.0	-1	1.8	0.04

NOTE: See p. 31 for definitions of “limited” and “expanded” health controls.

Table 14 summarizes our findings; it reports our average predicted use rate based on insurance in the prior year relative to the average prediction using the current variable. As we hypothesize, estimated use rates for the insured are higher when insurance status is defined over the full year rather than the current period, because the latter definition will include the experience of some individuals who had periods of uninsurance in the previous year. Estimated use rates for the uninsured are lower when insurance status is defined over the full year rather than the current status, because the latter will include the experience of some individuals who experience periods of insurance. The table suggests that estimates of the use by the uninsured relative to the insured based on the current insurance status will overstate the full year access gap in the probability of an ambulatory contact by about 7 percent for adults and children and the estimate of the relative quantity of ambulatory contacts by users by 7 percent for adults and 5 percent for children. For hospital care, the admission rate for the uninsured relative to the insured is overestimated by about 10 percent for adults and 7 percent for children using the current insurance status, and the relative use of the hospital for the uninsured with a hospitalization is overestimated by 4 percent,

Effect of Utilization Definition on Estimate of the Gap

Estimates of the relative use of care by the uninsured and insured could vary substantially depending on the scope of services included in the measure of use, especially the measure of use of ambulatory care. For example, several studies have shown that restricted access to care in physicians offices leads to a substitution of care in alternative settings such as emergency rooms, hospital outpatient clinics, and other public clinics (Long et al., 1986). Thus, estimates of relative use of physicians' care might differ substantially depending on whether use in only office settings or in all settings is included in the measure. Similarly, other substitutes for direct physician care might include contacts with non-physician providers (for example, nurse practitioners) or telephone contacts; the inclusion or exclusion of such contacts might lead to different estimates of the access gap. Unfortunately, none of the studies in the published literature provides us with information to classify the study according to its definition of the explanatory variable and so we are unable to determine from the published data whether or to what extent this factor might account for the wide range of estimates.

TABLE 14. Ratio of Predicted Insured and Uninsured Use Rates Using Different Insurance Variables

Population and Source of Estimate	Ratio of Predicted Values Using Last Year Coverage vs. Current Coverage			
	Probability of Use		Quantity of Use for Those With Use	
	Insured Use Rate	Uninsured Use Rate	Insured Use Rate	Uninsured Use Rate
		Ambulatory Contacts		
Adults				
SIPP	103	**96**	101	**94**
NMES	101	93	103	**96**
Average	102	95	102	**95**
Children				
NMES	101	**94**	**102**	**97**
		Hospital Days		
Adults				
SIPP	105	**89**	101	**99**
NMES	100	94	99	**93**
Average	102	92	100	**96**
Children				
NMES	100	**93**	100	**96**

We examine this issue here by comparing the magnitude of the access gap using several alternative definitions of ambulatory care use derived from the NMES data. The concept of ambulatory care that we have used throughout this study includes contacts with physicians and other medical providers in all outpatient settings and telephone contacts. This is the concept that is intended in the single question about the prior year utilization asked of respondents to the SIPP and HIS. The NMES includes a series of questions about contacts in different settings and we have aggregated responses to these questions to obtain a measure of ambulatory use that reflects our concept.

In addition, we have applied our estimation methodology to two alternative concepts of ambulatory care based on the responses to the NMES question series. One alternative definition covers all contacts with physicians in any setting; thus, it excludes visits to chiropractors, psychologists and psychiatric social workers, physical therapists, nurse practitioners, podiatrists, and other non-physician medical care providers. The second alternative definition looks at the access gap in office visits to all providers -- that is, it excludes telephone contacts and visits to clinics and hospital emergency rooms.

Table 15 displays the estimates of the access gap using different definitions of ambulatory contacts in the NMES. For both children and adults, the estimated access gap is highest when we include all practitioners and all settings, and lower when we restrict the definition of ambulatory care to treatment by a physician or to treatment in an office setting. This implies that the uninsured receive a higher proportion of their ambulatory care treatment from physicians and a smaller share from non-physician practitioners than do the insured and that the uninsured receive a higher proportion of their ambulatory treatment in the office setting and a smaller proportion in other settings than do the insured. This is counter to the hypothesis that the uninsured substitute care in alternative settings or by alternative providers for care by a physician in the office. Rather it may suggest that there are certain types of treatment for which the access gap is larger than others.

TABLE 15. Difference **in Access Gap Using Different Definitions of Ambulatory Contacts in NMES**

Definitions	Gap in Probability of Use (in percent)	Gap in Contacts Per User	Gap in Contacts Per Person
		Adults	
All sites and practitioners	-20%-	-1.6	-2.2
All sites, physicians only	-20	-1,3	-1.6
Office visits, all practitioners	-22	-1.3	-1,9
		Children	
All sites and practitioners	-12	-0.8	-1.1
All sites, physicians only	-13	-0.6	-0.8
Office visits, all practitioners	-12	-006	-0.8

NOTE: Ambulatory contacts include visits at all sites, including physicians' offices, clinics, and hospital outpatient departments.

The Uninsured Access Gap

Uninsured adults receive about 60 to **75** percent of the care that they would if insured. The access gap is about 1 to 2 ambulatory care contacts per person per year and about 16 to 25 inpatient days of care per 100 uninsured adults. These estimates are shown in Table 16 which reports our estimates of the access gap from the three databases, The table reports predicted current use for the uninsured population (labeled uninsured), the predicted use by the uninsured population if they were covered by employer-sponsored insurance (labeled insured), and the difference in the predictions (access gap). These estimates adjust for the primary factors that we found that might explain the variation in the results in the research literature. Namely, our estimate of the access gap is the marginal effect of insurance controlling for other characteristics that distinguish the insured from the uninsured. We have adjusted the estimates of the access gap in the HIS data based on the measure of current insurance to a measure of the full year gap, (We multiply predicted values of use for an insured or uninsured person by the average factors

TABLE 16. Uninsured Access Gap for Adults: Estimates from Three Surveys
Predicted Use Rates for Uninsured Adults

Data Source and Insurance Status of Person	Ambulatory Contacts			Hospital Days		
	Adults in Fair or Poor Health	Adults in Excellent or Good Health	All Adults	Adults in Fair or Poor Health	Adults in Excellent or Good Health	All Adults
SIPP						
Uninsured	**4.5**	1.9	**2.4**	1.07	0.30	0.45
Insured	**‘7.2**	2.8	**3.6**	1.64	0.36	0.61
Access Gap	**-2.7**	-0.9	**-1.2**	-0.57	-0.06	-0.16
Relative Use	**63%**	68%	**67%**	65%	83%	74%
NMES						
Uninsured	5.0	**2.3**	**2.9**	**0.78**	**0.23**	0.34
Insured	9.0	**4.1**	**5.1**	**1.54**	**0.34**	0.58
Access Gap	-4.0	**-1.8**	**-2.2**	**-0.76**	**-0.11**	-0.24
Relative Use	56%	**56%**	**57%**	**51%**	**68%**	59%
HIS[a]						
Uninsured	**5.2**	**2.3**	**2.8**	**1.23**	**0.32**	0.50
Insured	**8.0**	**3.4**	**4.3**	**1.91**	0.44	0.73
Access Gap	**-2.8**	**-1.1**	**-1.5**	**-0.68**	-0.12	-0.23
Relative Use	**65%**	**68%**	**65%**	**64%**	73%	69%

[a] Adjusted for different definition of insurance status

shown in Table 14). The access gap is corrected for differences in the gap between those in good and poor health, for the temporal change in the gap in ambulatory care, and for the declining length of hospital stays over time; that is, our estimates come from a model that includes an interaction between health status and insurance, between time and insurance, and a shift in the overall level of use over time. [19]

The literature we reviewed earlier provided a range of estimates of relative use that varied by about 50 percentage points for ambulatory care and by about 70 percentage points for hospital care. Our current estimates, based on many of these same data sources and with the adjustments noted, substantially narrow this range to a 10 percentage point spread for ambulatory care and a 15 percentage point spread for inpatient care. Nonetheless, some differences remain for which we have no ready explanation; differences in survey methods may account for the remaining spread,

All three data sources show that the absolute magnitude of the gap is greater for adults in poor health than those in good health, The results shown in Table 16 are the total effects of health among the uninsured. In contrast to the marginal effects of health that we reported earlier that control for other differences in characteristics between the uninsured in good and poor health, the measure of the access gap in Table 16 incorporates those differences. It provides a comparison of the incremental care that the population of uninsured who are in fair or poor health as compared to those in excellent or good health would receive under national reform. Under reform, the additional ambulatory care for an uninsured adult in good health would be about 1 to 2 visits whereas an adult in poor health would have about 2 to 4 additional visits per year. Additional hospital days of care for the uninsured in poor health would number about 60 to 80 per 100 persons under universal coverage; for the uninsured in good health the increased hospital days would average about 6 to 12 per 100 persons.

We are able to measure the access gap for children in two of the data sources studied. Our estimates from these two studies are reported in Table 17. The access gap for children is slightly less than that for adults; uninsured children receive about 70 percent as many ambulatory care services as otherwise similar insured children and have about 75 to 85 percent as many inpatient days. As with adults, the gap is greater for the uninsured in poor health than for those in good health.

[19] Because our Utilization models use indicator variables for each year rather than a parametric specification of the effect of time, we predict the access gap to the most recent year of observation for each data source.

TABLE 17. Uninsured Access Gap for Children: Estimates from Two Surveys
Predicted Use Rates for Uninsured Children

Data Source and Insurance Status of Person	Ambulatory Contacts			Hospital Days		
	Children in Fair or Poor Health	Children in Excellent or Good Health	All Children	Children in Fair or Poor Health	Children in Excellent or Good Health	All Children
NMES						
Uninsured	**3.3**	**2.4**	**2.4**	0.15	0.18	0.18
Insured	**6.5**	**3.2**	**3.5**	0.53	0.18	0.21
Access Gap	**-3,2**	**-0.8**	**-1.1**	-0.38	0.00	-0.03
Relative Use	**51%**	**75%**	**69%I**	28%	100%	85%
HIS[a]						
Uninsured	**3.6**	**1.9**	**2.1**	**0.66**	**0.20**	**0.24**
Insured	**6.2**	**2.9**	**3.1**	1.14	**0.24**	**0.31**
Access Gap	**-2.6**	-1.0	-1.0	-0.48	**-0.04**	**-0.07**
Relative Use	**58%**	**66%**	**68%**	58%	**83%**	**77%**

‘Adjusted for different different of insurance status.

For our estimates of the costs of guaranteed universal coverage under national reform, we have used a "best" estimate of the access gap which is the average across the three estimates for adults and the two estimates for children. Tables 18 and 19 report these "best" estimates.

These estimates of the access gap and of the demand that would be induced by universal coverage derive from a comparison of health care use by the uninsured and insured individuals who are alike in their demographic and economic characteristics and who are similar on some gross measures of health status. We assume that the currently uninsured would use at the same rates as these insured counterparts under national reform. However, there may be unobserved characteristics that differentiate the currently uninsured from the insured that would affect health use and for which we cannot adjust. One comparison of health care use by previously uninsured individuals once they acquired insurance with those who were continuously insured suggests that the uninsured might continue to use at somewhat lower rates even when they acquire insurance (Marquis and Harrison, 1992). That study suggested that the currently uninsured might continue to use care at a rate equal to only about 85 percent of use by those currently insured, even under universal coverage. That study was based on small samples and reflects utilization patterns of the late 70s, Nonetheless, the results of that study do suggest that our estimate of induced demand might be as much as 50 percent too high. If this were the case, the added spending under universal coverage would be smaller than the increase of less than 3 percent that we estimate.

TABLE 18. Best Estimates[a] of Uninsured Access Gap for Adults
Predicted Use Rates for Uninsured Adults

Insurance status of Person	Adults in Fair or Poor Health			Adults in Excellent or Good Health			All Adults		
	Probability of Use	Quantity per User	Quantity per Person	Probability of Use	Quantity per User	Quantity per Person	Probability of Use	Quantity per User	Quantity per Person
				Ambulatory Contacts					
Uninsured	64%	7.3	4.9	49%	4.1	2.2	52%	4.8	2.7
Insured	82	9.6	8.1	67	4.9	3.4	**70**	**5.9**	**4.4**
Access Gap	-18	**-2.3**	**-3.2**	-18	-0.8	-1.2	-18	-1.1	-1.7
Relative Use	78%	76%	60%	73%	83%	65%	74%	81%	61%
				Hospital Days					
Uninsured	11	9.1	1.03	**5**	**6.1**	0.29	6	6.7	0.43
Insured	19	8.6	1.70	7	5.7	0.38	9	6.3	0.64
Access Gap	-8	0.5	-0.67	-2	0.4	-0.09	-3	0.4	-0.21
Relative Use	58%	106%	61%	71%	107%	76%	67%	106%	67%

'Source: Average of estimates from SIPP, NMES, and HIS.

TABLE 19. Best Estimates' of Uninsured Access Gap for Children Predicted Use Rates for Uninsured Children

Insurance status of Person	Children in Fair or Poor Health			Children in Excellent or Good Health			All Children		
	Probability of Use	Quantity per User	Quantity per Person	probability of Use	Quantity per User	Quantity per Person	Probability of Use	Quantity per User	Quantity per Person
				Ambulatory Contacts					
Uninsured	69%	4.8	3.5	59%	3.5	2.1	60	3.5	2.3
Insured	79	7.9	6.4	73	4.0	3.1	73	4.3	3.3
Access Gap	10	-3.1	-2.9	-14	-0.5	-1.0	-13	-0.8	-1.0
Relative Use	87%	61%	55%	81%	88%	68%'	82%	81%	70%
				Hospital Days					
Uninsured	6	5.8	0.41	3	6.3	0.19	3	6.2	0.21
Insured	10	7.3	0.84	4	4.9	0.21	4	5.1	0.26
Access Gap	-4	-1.5	-0.43	-1	1.4	-0.02	-1	1.1	0.05
Relative Use	60%	79%	49%	75%	128%	90%	75%	122%	81%

[a] **%urox** Average of estimates from NMES and HIS.

CHAPTER 4. IMPLICATIONS FOR HEALTH RESOURCE CAPACITY AND COSTS OF NATIONAL REFORM

PREDICTING AGGREGATE CURRENT AND INCREASED USE BY THE UNINSURED

We simulate aggregate use by the currently uninsured and the increased demand that would result under universal coverage using the estimates of health care utilization described in the preceding section. The NMES population weighted[20] sample of all persons who had some spell of uninsurance during the survey year is used to make the predictions. However, to account for some changes in the size and mix of the uninsured population since 1987, we adjust (multiply) the NMES population weights by the rate of growth in the number of uninsured to 1992 as measured from the March Current Population Survey in the two years; separate growth factors were applied to adults and children.[21] We also adjust the NMES population weights to reflect the age and sex composition of the uninsured population in the 1992 Current Population Survey. The adjusted estimates of the number of adults and children with some spell of uninsurance during 1992 are shown in Table 20.[22]

For each of the NMES sample persons with some spell of uninsurance during the year, we simulate what their use of ambulatory care and of inpatient care would be if uninsured for the full year and what their use would be if insured for the full year. For those individuals with a full year spell of uninsurance, the predicted annual uninsurance use rate represents their use while uninsured, and the difference between the predicted uninsured and insured use rate is the increased demand.

---

[20]The population weights assign to each individual in the sample a weight that reflects the number of persons in the population that the sample individual represents. Thus the population weights sum to the national population.

[21]Most analysts believe the CPS figure represents the number of uninsured at a point in time. We apply the CPS estimates of growth rate in the number uninsured at one point in time to both those uninsured all year and the part year uninsured.

[22]Our estimate of 57 million persons with a spell of uninsurance exceeds the number of 37 million often cited because the latter refers to one point in time and our 57 million refers to persons with some period of uninsurance during a year. We used NMES data to estimate the uninsured because our SIPP dataset does not include children. However, we obtained similar estimates of uninsured adults using the SIPP. Applying the methods described to SIPP, we estimate 40.0 million adults with a spell of uninsurance, of whom 25.8 million are uninsured a part of the year and 14.2 million are full year uninsured.

TABLE 20. Number of Uninsured Used in Aggregate Predictions
(millions)

	Adults	Children	Total
Full year uninsured	16.3	5.1	21.4
Part year uninsured	25.9	9.8	35.7
Total with spell of uninsurance	42.2	14.9	57.1

For those individuals with a part year spell of uninsurance, we need to adjust the annual uninsured rate and the annual increased demand rate to account for their part year experience. Our adjustment is based on the SIPP data which showed that those with a part year of uninsurance were uninsured for an average of 43 percent of the year; therefore we multiply the predicted annual uninsured use and the predicted annual rate of increased demand by 0.43 for each individual in our simulation sample who had less than a full year of uninsurance. [23] We then multiply each individual's predicted use during their period of uninsurance and the additional care they would demand if insured during that period by their sample weight, and aggregate across all sample persons to estimate aggregate uninsured use and induced demand. Our procedure assumes that the access gap for the part year uninsured is in proportion to the length of their spell of uninsurance. Other research has suggested that people who move from being uninsured to insured use health care in each state at the rate they would if continuously in that state (Long and Rodgers, 1990; Keeler, et al., 1988). This evidence indicates that the part year uninsured do not or cannot schedule care to coincide with their insured state. If they did so, then the annual access gap would be smaller than we assume and these individuals would not be expected to consume many additional services with a continuous year of insurance. But the research evidence supports our assumption and estimation procedure.

We make predictions in this way using the estimated utilization models from each of our three data sources, and average the resulting estimates.

MEASURES OF HEALTH SYSTEM CAPACITY

The discussion of aggregate use in Chapter 2 placed our measures of aggregate increased demand by the uninsured in the context of various measures of the capacity of the U.S. health system. To evaluate the percent of aggregate utilization represented by the increased ambulatory contacts and inpatient hospital days, we used estimates from the 1991 Health Interview Survey, the most recent available (National Center for Health Statistics, 1992a). There are several alternative sources of aggregate use data. We judged the HIS data to be most comparable to sources used in calculating our numerator, thereby best reflecting the relative increase in aggregate demand for health care. The projections of growth in the number of active physicians are from the Bureau of Health Manpower (National Center for Health Statistics, 1992b). The calculations of the impact of increased

[23] By applying the average length of a spell of uninsurance for those with a part year spell of uninsurance to all sample persons with part year spell. we assume that the length of the spell is no! correlated with demographic characteristics that are important determinants of health care use.

demand on hospital capacity and occupancy rates were based on American Hospital Association data from its 1991 annual survey (American Hospital Association, 1992).

RESOURCE COSTS AND PREMIUMS

Resource Costs

The resource costs shown in Table 4 in Chapter 2 are the product of aggregate demand from Table 3 and unit costs of each service calculated from the Health Care Financing Administration's estimates of National Health Expenditures (Letsch et al., 1992) and the Health Interview Survey estimates of aggregate use discussed above. The National Health Expenditures' (NHE) estimates' service definitions are not consistent with those used in our underlying utilization estimates. Specifically, hospital spending for inpatient care and outpatient care are combined in the NHE; the latter is included in our measure of ambulatory services. Physician services at all other sites, including inpatient services billed by physicians, comprise another category in the NHE. We used data from the 1991 NHE, the latest available, to calculate aggregate spending for a) inpatient hospital services and b) ambulatory care services and inpatient physician services by reallocating an estimate of outpatient hospital spending from the hospital to the ambulatory care category. This calculation was based on estimates of the proportions of spending that were for inpatient versus outpatient care in community hospitals, combined with information on the shares of total hospital spending that are attributable to community, to Federal, and to non-community, non-Federal hospitals. Dividing by the 1991 HIS aggregate use estimates yielded cost per unit estimates of $1,320 in inpatient hospital spending per inpatient day and $153 in spending for ambulatory care and inpatient physician services per ambulatory contact. These were inflated to represent 1993 dollars using annual rates of growth for hospital and physician spending from recent years based on the NHE estimates, less one percentage point for population growth, because it is already accounted for in the population weights underlying the aggregate utilization estimates.

Our procedure allocates some share of the cost of each inpatient physician service that is billed to patients to the ambulatory contacts they have during the year. This procedure is necessitated by lack of aggregate expenditure data to allow us to separate these costs. However, when we multiply this unit cost by the increased number of ambulatory contacts that the uninsured will make once insured, we implicitly assume that inpatient physician contacts increase proportionately to ambulatory contacts. But, we found that the access gap in inpatient care (measured in length of stay) is slightly less than the gap in ambulatory contacts (see Figures 1 and 2). Therefore, our methods for estimating costs may somewhat overstate the increased resource costs of covering the uninsured.

We considered the sensitivity of our estimates to the calculated unit costs of service. Our ultimate objective is to assess the effect on national health spending of covering the uninsured. Therefore, we have more confidence in the numerator for each unit cost calculation, because it is derived from reports of aggregate health spending. In contrast, the denominators are subject to greater error because they are based on household surveys. Specifically, the aggregate inpatient hospital days estimated from the HIS (167 million) fall considerably short of totals estimated by surveys of hospitals by the American Hospital Association (200 to 300 million depending on the breadth with which "hospital" is

defined). This is because the HIS excludes the institutionalized population, the military, and those who died during the year, As a result of using considerably larger denominators, estimates of health spending per inpatient day from other sources can be as much as 40 percent lower than ours, When averaged with ambulatory care, which would not be nearly as sensitive to these exclusions, the effect on our estimate of increased health spending would be to reduce it from $19.9 billion to $15.9 billion.

We also examined the sensitivity of our estimates to the possibility that the uninsured would use a different intensity of services once they become insured, compared to the intensity of services for the currently insured. Physicians have an incentive to minimize the time they now spend with the uninsured because they often are unable to collect their full fees from this group, and so we might expect that the intensity of treatment of the previously uninsured might rise after health reform. If so, then our cost estimates should be adjusted upwards. To test this for ambulatory care, the best measure of intensity would be relative value units, such as the schedule used in setting Medicare fees. But there are no good sources of such data for the uninsured, of course, because they file no claims, A cruder measure is the time spent by the physician during the visit. Examining data from the 1985 National Ambulatory Medical Care Survey, we found that over all doctor visits, the uninsured were seen for 3.6 percent more minutes than the insured after adjusting for demographic characteristics. One interpretation of this information is that those uninsured who are currently seen are sicker than the mix of patients that will be presenting themselves once the uninsured have coverage, This would call for a small reduction in our resource cost estimate, since it was based on the average intensity of all visits currently, nearly all of which are for the uninsured; that is contrary to our intuitive argument, the data suggest our estimate overstates the added resource costs. In either case, however, an adjustment for intensity would have essentially no effect on our conclusion that incremental resource demands and health care spending will be a very small proportion of current levels.

Turning to inpatient hospital care, we compared measures of charges per inpatient day for privately insured patients to those for patients who either self-paid or were not charged. Unfortunately, there was no single source of this measure. We calculated it based on data from the 1987 file of the Hospital Cost and Utilization Project on charges per discharge by payer, adjusted by data on days per discharge from the 1990 National Hospital Discharge Survey. Although there are a number of reasons for concern about charge data as a measure of intensity, the results of our calculations are that hospital spending on account of the uninsured might be as much as 28 percent (about $9 billion) more than the total resource use shown in Table 4. Nonetheless, as a proportion of total hospital capacity and spending, national health reform would imply a small increase, even under this assumption.

Health Insurance Premiums

To estimate aggregate premium costs of insuring the uninsured, the resource cost estimates from Table 4 had to be adjusted in several ways. First, premiums would be lower than resource costs to the extent that cost sharing is used in a plan. This reflects both the transfer of liabilities from the insurer to the consumer and the reduction of consumption due to the economic incentives from cost sharing, We estimated this effect

by calculating out-of-pocket payments as a percentage of both out-of-pocket and private insurance payments for hospital and physician services in the NHE estimates. The resulting figure is 17.5[24] percent. On the other hand, premiums would be *higher* than resource costs because of the administrative costs of private insurance. Again, from the NHE, we estimated that insurance administration accounted for 16.8 percent of private insurance spending for all personal health services. The net of the two effects on premiums for the uninsured is to make them only $0.4 billion higher than the $60.5 billion shown in Table 4, or $60.9 billion. Finally, the health reform benefit package might include services in addition to all inpatient hospital care and all physician services. If payments for the newly insured for these services remain the same proportion as they are under current private insurance plans, then including drugs and other professional services in the benefit package would raise the $60 billion by 13 percent, or to about $70 billion.

As a validity check on our NHE-based estimates, which rely largely on aggregate data from the health sector, we performed an independent calculation using premiums from the current employer group insurance market. We used two premium estimates. The 1991 HIAA survey of employer-sponsored health insurance found a mean annual family premium rate of $4,260, or about $5,150 when expressed in 1993 dollars. Unpublished preliminary and partial data from a Robert Wood Johnson Foundation survey of employer provided health insurance in ten states suggests that annual family premiums are about $4,900 in 1993. Assuming 2.5 people per covered family yields a per person premium of about $2,000, near the midpoint of the two family rates.[25]

To convert these annual premiums to an estimate of the aggregate cost of covering the uninsured, we need to multiply by the number of uninsured person years annually. Our estimates in Table 20 show that 57 million persons are uninsured at some point during a year, however only 21.4 million of these persons experience a full year of uninsurance. The remaining 35,7 million persons have 0.43 years of uninsurance annually, so the number of person years of uninsurance (or the number of full-year equivalent uninsured persons) is 37 million (21.4 + [0.43 x 35.7] =36.8). This figure is consistent with the March 1993 CPS data which put the number of uninsured at any point in time at 37 million. Since in any month there are 37 million uninsured persons, there will be 37 million uninsured person years annually even though some of the uninsured at one point in time will move into the insured state and others insured at that time will become uninsured over the year. Multiplying the 37 million uninsured person years by the per person premium given above, the aggregate annual premium cost would be $74.5 billion, a figure that falls very close to the $70 billion figure for all covered services above.

24%HE accounts do not permit an estimate specific to the privately insured. Our estimate includes out-of-pocket costs for the uninsured and the Medicare population in its numerator, as well as supplementary private insurance for the Medicare population in its denominator. This may impart a small bias. but its direction is not known.

[25]The average family size in the NMES sample we studied was 2.4,

REFERENCES

Aday, L. A. and R. M. Anderson, "The National Profile of Access to Medical Care, Where Do We Stand'?" *American Journal of Public Health, 74, 12, 1984,* pp. 1331-1339.

American Hospital Association, *American Hospital Association Hospital Statistics, 1992-93 Edition,* Chicago, IL: American Hospital Association, 1992, Table 2A, pp. 8-9.

Anderson, R,, M. Chen, L. A, Aday, L. Cornelius, "Health Status and Medical Care Utilization," *Health Affairs, 6,1,* Spring 1987, pp. 136-156.

Berk, M., A. Bernstein, and A, Taylor, "USC and Availability of Medical Care in Federally Designated Health Manpower Shortage Areas, " *Health Affairs, 20,* Winter 1983, pp. 369-380.

Chcn, M. and C. S, Lyttle, "Multivariate Analysis of Access to Care, " in R. M, Andcrsen, L. A. Aday, C. S. Lyttle et al., eds., *Ambulatory Care and Insurance Coverage in an Era of Constraint,* Chicago, IL: Pluribus, 1987.

Corey, Christopher and Howard Freeman, "Use of Telephone Interviewing in Health Care Research, " *Health Services Research, 25, 1,* April 1990, Part 1, pp. 129-144.

Cornelius, L, J., K. Beauregard, and J. Cohen, "Usual Sources of Medical Care and Their Characteristics, " *NMES Research Findings,* 11, AHCPR Pub. No. 91-0042, Rockville, MD: Agency for Health Care Policy and Research, September 1991.

Davis, Karen and Diane Rowland, "Uninsured and Underserved: Inequities in Health Care in the United States, " *Milbank Memorial Fund Quarterly/Health and Society, 61, 2, 1983, pp. 149-176.*

Duan, N., et al,, *A Comparison of Alternative models for the Demand for Medical Care,* RAND, R-2754-HHS, January 1982.

Freeman, Howard E., R. Blendon, L. Aiken, S, Sudman, C. Mullinix, and C, Corey, "Americans Report on Their Access to Health Care, " *Health Affairs, 6,* 1, Spring 1987, pp. 6-18,

Hayward, R., M. Shapiro, H. Freeman, and C. Corey, "Inequities in Health Services Among Insured Americans: Do Working-Age Adults Have Less Access to Medical Care Than the Elderly'?" New *England Journal of Medicine,* **318, 23, 1988,** pp. 1507-1512.

Keeler, Emmett B., et al,, The Demand for Episodes of Medical Treatment, in the *Health Insurance Experiment,* RAND, R-3454 -HHS, 1988.

Letsch, S. W,, H. C. Lazenby, K. R. Levit, and C. A, Cowen, "National Health Expenditures, 1991 ," *Health Care Financing Review', 14, 2,* Winter 1992, pp. 1-30.

Long, Stephen H. and Jack Rodgers, The Effects of Being Uninsured on Health Care Service Use: Estimates from the Survey of Income and Program Participation, *SIPP Working Paper Series, No. 9012,* Washington, D. C.: U.S. Bureau of the Census, October 1990.

Long, Stephen H. and Russell F. Settle, Cutbacks in Medicaid Eligibility Under the Omnibus Budget Reconciliation Act of 1981: Implications for Access to Health Care Services Among the Newly Eligible, HCFA Contract No. 500-83-0058, unpublished report, 1985.

Long, Stephen H., Russell F. Settle, and Bruce C. Stuart, Reimbursement and Access to Physicians' Services Under Medicaid, *Journal of Health Economics, 5, 1986,* pp. 235-251.

Manning, W., et al,, Health Insurance and the Demand for Medical Care, *American Economic Review, 77, 3, 1978.*

Marquis, M. Susan and Ellen R. Harrison, Study 2: Health Status and Health Care Use of Uninsured Workers, in U.S. Department of Labor, Pension and Welfare Benefits Administration, *Health Benefits and the Workforce, 1992,* pp. *21-36.*

National Center for Health Statistics, "Current Estimates from the National Health Interview Survey, 1991 ," *Vital and Health Statistics, Series* 10, Number 184, Hyattsville, MD: Public Health Service, 1992a, pp. 114, 126.

National Center for Health Statistics, *Health, United States, 1990,* Hyattsville, MD: Public Health Service, 1992b, Table 99, p. 143.

Rosenbach, M. L., Insurance Coverage and Ambulatory Medical Care of Low-Income Children: United States, 1980, Series C, Analytical Report No. 1, DHHS Pub. No. 85-20401, Hyattsville, MD: National Center for Health Statistics, September 1985,

Rosenbach, Margo L., The Impact of Medicaid on Physician Use by Low-Income Children, *American Journal of Public Health, 79, 1989,* pp. 1220-1226.

Rowland, D. and B. Lyons, Triple Jeopardy: Rural, Poor, and Uninsured, *Health Services Research, 23, 6, 1989,* pp. 975-1004,

Short, P. F. and D. C. Lefkowitz, Encouraging Preventive Services for Low-Income Children: The Effect of Expanding Medicaid, *Medical Care, 30,9,* September 1992, pp. 766-780.

Spillman, B, C., The Impact of Being Uninsured on Utilization of Basic Health Care Services, *Inquiry, 29,* Winter 1992, pp. 457-466.

Sullivan, C. B., M. Miller, R. Feldman, and B. Dowd, Employer-Sponsored Health Insurance in 1991, *Health Affairs,* 11, *4,* Winter 1992, pp. 172-185.

Yelin, E., J. Kramer and W. Epstein, Is Health Care Use Equivalent Across Social Groups'? A Diagnosis-Based Study, *American Journal of Public Health, 73,5, 1983, PP. 563-571.*

Wilensky, Gail R. and Marc L. Berk, Health Care, the Poor, and the Role of Medicaid, *Health Affairs, 1, 3,* Fall 1982, pp. 93-100,

Woolhandler, S. and D, Himmelstein, Reverse Targeting of Preventive Care Due to Lack of Health Insurance, *Journal of the American Medical Association, 259, 19, 1988, PP. 2872-2874.*