A RAND NOTE

# Mandating Health Insurance Benefits for Employees: Effects on Health Care Use and Employers' Costs

M. Susan Marquis, Joan L. Buchanan,
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Man-bing Sze

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RAND

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## PREFACE

This Note presents preliminary estimates of the effect mandating minimum health benefit plans for employees will have on health care use by those affected and the cost to employers of providing the additional coverage. It also proposes some refinements to the estimation methods for subsequent work.

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## SUMMARY

More than 37 million Americans are uninsured, and more than three-fourths of these are employed or the dependents of employed individuals. Because the majority of the uninsured are employed, many believe that the expansion of employer-based insurance offers the best opportunity for improving access to care by this group. Mandated employer-based group coverage would extend health insurance protection to many Americans who are not now covered by insurance. As a result, these individuals could expect to pay less out-of-pocket for their health care than in the past; this, in turn, is expected to induce this group to use additional services. The direct effect of mandated coverage on employers is an increase in employer premium payments for health coverage of workers.

This Note presents estimates of the increase in health services use and the increase in employers' liability for health care costs that would result from mandating employer health insurance. Underlying the estimation is a model of the demand for episodes of medical care based on data collected in the RAND Health Insurance Experiment (HIE). The episode model specifies the relationship between the propensity to experience one of four types of medical episodes, individual characteristics (such as age, family income, and the individual's health status), and the share of the medical bill that the patient must pay out-of-pocket. The four types of episodes are hospitalization, outpatient episodes for the treatment of chronic conditions, outpatient treatment for acute conditions, and well-care episodes. For each type of episode, the model relates the size or total charge for the episode to characteristics of the patient and the patient's share of the cost.

An episode simulation model processes a database in which the observations are individuals in families. The model simulates the expenditures for each individual during the course of a year using alternative assumptions about the mandated benefits provided to the individual. An episode simulation model allows for taking account of the fact that under most insurance policies the share of the bill that the patient pays varies during the year. The share that the patient pays is 100 percent at the beginning of the year if the plan includes a deductible. Once the deductible is satisfied, the share falls to the coinsurance rate, and it may change again if there is a catastrophic limit on out-of-pocket spending. The episode simulation tracks the amount the individual and family have spent at any time during the course of the year and adjusts the cost sharing rate accordingly.

The simulation uses a subset of individuals from the RAND Health Insurance Experiment because of the availability of detailed information about the health status and insurance coverage of these individuals. The subset includes individuals who are like those who would be affected by mandated benefit legislation—namely, employees who are not covered by their own employer group plan, and the nonworking spouse and other dependents of employees if the dependents are not covered by the group plan. We use current estimates of the total number of individuals who would be affected to weight the sample to obtain total cost estimates.

The simulation looks at two different mandated benefit packages. One package (Plan A) specifies a $250 individual deductible, a $500 family deductible, a 20 percent coinsurance above the deductible, and a $3000 limit on out-of-pocket expenditures. The other package (Plan B) includes a $1000 individual deductible, a $1500 family deductible, and no cost sharing above the deductible.

The simulation produces estimates of only a very small increase in total spending—$1.3 billion to $2.5 billion—although there is obviously a much more dramatic shift in who pays the bill. The estimates for the two benefit packages were surprisingly close. In fact, although Plan B has a higher deductible than Plan A, it actually turns out to be more expensive. The reason is that in Plan B all expenditures above the deductible are reimbursed in full, whereas Plan A requires some continued cost sharing up to the $3000 cap. This cost sharing restrains demand.

The new group policies would pay out an estimated $19.5 to $20 billion in benefits. This would also be the amount of an actuarially fair premium—one that did not include any charge for administration or coverage of the insurer's risk. The employers' share of this actuarially fair premium is about $16 billion. Inflating this estimate for administrative costs and risk costs that insurers would be expected to charge, employers' increased insurance costs would be about $20 billion.

The estimates are only for the incremental costs of new policies. Some employees who have coverage below the minimum mandated may receive expanded protection under legislative proposals, but this is not factored into the current estimates. In addition, the estimates assure that employees who are currently covered under another family member's group plan do not add new costs to employers. These individuals shift their coverage from the other family member's group to their own group; this would shift the burden of insurance costs but would not increase aggregate costs. This shift in costs would fall primarily on the retail trade and services industries because employees currently covered

under another family member's group plan are predominantly women employed in these sectors.

This Note proposes several directions for modifying the methodology to improve estimates of future insurance proposals. One type of modification would make some alterations in the generation of episodes to improve the estimation of the number and size of mental health episodes and maternity episodes; most insurance proposals specify special treatment for these services. This Note also proposes incorporation of a technological enhancement factor to account for changes in the intensity of care delivered for an episode that have occurred since the RAND data used to develop the model were collected.

The other area for further work centers on changes in the input database. The project plans to incorporate estimates of the cost of expanding benefits for employees and dependents whose coverage is below the minimum mandated. It also plans to incorporate new assumptions about dual coverage for employees without their own group coverage who are insured under another group. Finally, the simulation uses the HIE database because of its wealth of detail on health status and insurance coverage; however, it was not a national sample and was taken more than 15 years ago. As a test of the generalizability of the estimates made using the HIE sample, future work will process a nationally representative sample from the Current Population Survey, and compare the estimates derived from the two databases.

## ACKNOWLEDGMENTS

We are grateful to our RAND colleague Arleen Leibowitz for a thoughtful and constructive review of this Note. Gary Hendricks and Patricia Willis, Department of Labor, and Albert Williams, RAND, also made helpful comments. We appreciate assistance provided by Katherine Swartz, Urban Institute, in obtaining descriptive information about the uninsured. We thank Barbara Thurston for preparation of the manuscript and Cheryl Handel for careful editing of the manuscript.

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## TABLES

## I. BACKGROUND

More than 37 million Americans are uninsured, and more than three-fourths of these are employed or the dependents of employed individuals (Regula, 1987; Monheit et al., 1985). Because the majority of the uninsured are employed, many believe that the expansion of employer-based insurance offers the best opportunity for improving access to care by this group. The Congress is currently considering proposals that would mandate that employers provide at least a minimum package of health benefits to all full-time employees and their dependents not covered by employment-based plans. The states are also looking at ways to encourage employers to purchase health-care coverage for workers.

Mandated employer-based group coverage would extend health insurance protection to many Americans who are not now covered by insurance; it would also enhance the protection of others who have coverage (either through employment-based plans or through privately purchased insurance) that is less than the proposed minimum benefit package. As a result, these individuals can expect to pay less out-of-pocket for their health care than in the past. In addition, because the cost to these individuals of obtaining care is lowered, they can be expected to use more services than in the past.

Requiring employers to expand health insurance coverage to all workers would affect the amount that employers pay for health care as well. The direct effect on employers of mandated coverage is an increase in employer premium payments for health coverage of workers. The amount of the increase will depend on the package of benefits mandated, the way individuals' demand for health services varies with the amount of coverage, the number of workers and their dependents for whom the employer must provide new or additional coverage, and the share of the premium that the employer is required to pay.

In this Note, we present preliminary estimates of the increase in health services use and the increase in employers' liability for health care costs that would result from mandating two different prototypical benefit structures. One package of benefits that we will consider is similar to the benefits proposed in the Kennedy/Waxman Minimum Health Benefits for All Workers Act of 1987 (H.R. 2508 and S. 1265). The other prototype provides benefits similar to those proposed by Representative Stark in the Employee Health Benefits Improvement Act of 1988 (H.R. 4951).

Our estimates of the effects on employer and employee expenditures for health care are based on a model of health services demand developed as part of the RAND Health Insurance Experiment. The model specifies the relationship between an individual's expenditures on health care, the health care coverage of the person, and his or her demographic and health attributes. We use the model to predict the current health expenditures of employees and their dependents who would be affected by the proposed legislation, and then to predict their spending under the assumption that they are protected by the mandated benefits.

In Sec. II of this Note, we describe the two prototype mandated benefit structures to be considered. Section III presents an overview of the methodology used to simulate spending under the alternative plans. In Sec. IV, we describe the database used in the simulation, while Sec. V presents the results. A primary objective of this Note is to illustrate the methodology for estimating the costs of alternative insurance proposals. In coming months, we will refine certain components of the methodology and apply it to estimate the effects of other insurance options. Section VI discusses some of the planned refinements and summarizes the results obtained to date.

## II. PROTOTYPE MANDATED BENEFITS

The two prototype benefit structures that we will consider are similar to those set forth in proposals put before Congress.

### MANDATED PLAN A

One option, which we shall refer to as Mandated Plan A, includes benefits similar to those proposed in the Kennedy/Waxman Minimum Health Benefit for All Workers Act of 1987. The Kennedy/Waxman proposal specifies a minimum plan covering hospital care, medically necessary physician care, diagnostic tests, and prenatal and well-baby care. Patient cost sharing is limited to a deductible of $250 for an individual plan and $500 for a family plan, a coinsurance rate of 20 percent, and a cap on out-of-pocket expenses of $3000 per year. However, prenatal and well-baby care would be covered in full and not subject to the deductible or coinsurance. In addition, the plan would provide a mental health benefit covering up to 45 days of inpatient mental health care annually and up to 20 outpatient visits. Outpatient mental health care would be subject to 50 percent coinsurance. Each employer's plan would provide these minimum benefits or provide benefits of equivalent actuarial value, with the exception that full coverage for prenatal and well-baby care must be provided.

The benefits in the prototype Mandated Plan A differ from those in the Kennedy/Waxman proposal in the following ways: (1) The prototype plan covers prescription drugs. (2) The prototype is not subject to an actuarial equivalency test. (3) Inpatient mental health care is covered like any other inpatient service. (4) Up to 52 outpatient mental health visits per person per year are covered, subject to 50 percent coinsurance. These differences are dictated primarily by the health demand model used in the estimation. However, the differences are relatively minor. Prescription drugs account for only about 7 percent of total health care expenditures.[1] Only about 1.2 percent of individuals have more than 20 outpatient mental health visits per year, even when longer-term therapies are covered.[2] Therefore, the estimates of spending and employer costs under

[1]See Manning, Newhouse, Duan et al. (1987); Leibowitz, Manning, and Newhouse (1985).

[2]See Wells, Manning, Duan et al. (1982).

the prototype Mandated Plan A should closely approximate the results expected from enacting the Minimum Health Benefit Act.

**MANDATED PLAN B**

The benefit structure in the second option that we will examine is similar to that of the Employee Health Benefits Improvement Act of 1988 proposed by Representative Stark. Under Stark's proposal, employers would provide workers and their families with benefits similar in scope to Medicare, including hospital care, medically necessary physician care, and diagnostic testing; however, coverage for prescription drugs is not required in the proposal. Employees would be liable for a $1000 deductible under an individual policy and $1500 under a family policy; the plan would reimburse in full for expenditures above those amounts. As with the Kennedy-Waxman proposal, prenatal care and well-baby care would be fully reimbursed under Stark's proposal.

The scope of services in Mandated Plan B is the same as in Plan A—namely, inpatient hospital care, medically necessary physician care including up to 52 mental health visits, diagnostic tests, prescription drugs, prenatal care, and well-baby care. Thus Mandated Plan B differs from the Stark proposal in that it provides prescription drug coverage and an extended mental health benefit. The cost-sharing provisions in Plan B, however, are the same as in the Employee Health Benefits Improvement Act. Thus our estimates should approximate the expected effects of that proposal.

## III. ESTIMATION METHODOLOGY

Our estimates of the costs of the alternative plans will use simulation methodology developed as part of the RAND Health Insurance Experiment (HIE). The HIE was a randomized trial to investigate the effects of alternative health insurance plans on health care use and health status. The experiment was carried out between November 1974 and February 1982 in six sites. Families participating in the experiment were randomly assigned to one of a number of different health insurance plans that differed in the level of cost sharing. Because families were randomly assigned to plans, the HIE estimates of the relationship between insurance coverage and health services demand are not biased by the self-selection problems inherent in nonexperimental data.[1]

The simulation methodology that we will use draws on an analysis from the HIE of the effect of insurance on episodes of treatment (Keeler and Rolph, 1982; Keeler et al., 1988). We will next discuss briefly the reason for using analyses of episodes of treatment as the basis for the simulation. We will then give a nontechnical description of the simulation model.

### ADVANTAGES OF STUDYING EPISODES OF TREATMENT

Health insurance plans typically include a mix of deductibles, coinsurance rates, and upper limits on the patient's out-of-pocket expenses in a year. Thus, the price that an individual faces when making medical-care decisions may change during the course of a year from 100 percent of the charge (before the deductible is exceeded), to the coinsurance rate (a specified share of the billed charge), to full coverage (if the upper limit is exceeded). Thus the plan presents the consumer with a price schedule, rather than a single price. Most analyses of the demand for health services look at the effect of insurance plans on annual spending for health care. However, these estimates cannot easily be used to assess the effects of plans that provide for different price schedules than those studied—that is, a different combination of deductibles, coinsurance, and upper limits. In order to predict the effects of other plans, one needs to know how decisions to buy medical care during the year are made and how the decision at any time depends on the price applicable at that time. Studying

[1]A brief overview of the design of the experiment and a description of the data collected during the course of the experiment are contained in Taylor, Polich, and Sloss (1987).

different episodes of medical treatment that occur during the year allows one to examine those decisions.

An episode of treatment includes all the expenditures associated with a particular bout of illness; any individual typically has several treatment episodes during a year. The price that the consumer faces at any time may affect two decisions about a treatment episode. The first is the decision to begin an episode by contacting a doctor, for example, when flu symptoms are experienced or when it is time for an annual physical. Once a patient has decided to obtain care, the patient and doctor determine how much to spend on care for that episode; this decision, too, may be affected by the share of the cost the patient will have to bear.

The HIE analysis examined the effect of price and individual characteristics on five types of episodes: hospitalization, outpatient chronic, outpatient acute, well-care, and dental.[2] The results of the analyses showed that price has a significant impact on the rate at which the patient initiates episodes. For example, with 25 percent cost sharing, the rate of occurrence of ambulatory episodes is about 75 to 80 percent of the occurrence rate with no cost sharing. The effect of price on hospital episodes is somewhat smaller than the effect of price on ambulatory episodes. Price, however, has only a small effect on the total cost of an episode; that is, it appears that cost sharing affects patients' decisions to initiate episodes but does not affect doctors' decisions about how to treat patients. The analyses also revealed that price appears to be relatively unimportant when catastrophic illness occurs. Specifically, the rate at which "catastrophic" or very expensive hospitalizations occur was not affected by the level of patient cost sharing.

## OVERVIEW OF SIMULATION MODEL

The results of the HIE episode analysis have been incorporated in a stochastic simulation model that generates the occurrence of episodes for a family throughout the year depending on characteristics of the members of the family and the price facing the family. A technical description of the simulation model is included in Keeler et al. (1988). The following is a nontechnical summary of the model.

Any family is assumed to have an underlying propensity to experience each of the four medical episode types (hospitalization, outpatient chronic, outpatient acute, and well-care). The propensity to experience each episode type consists of a measured component determined by characteristics of the family and an unmeasured component that reflects

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[2]The simulation model we will use does not incorporate dental episodes because the minimum benefit plans studied do not include dental coverage.

[3]The unmeasured component for each episode type is drawn from a gamma distribution; the unmeasured components correlate across episode types to reflect the finding

unobserved characteristics of the family.[3] The propensity for any family is the sum of the propensities for each family member; these individual propensities depend on the demographic and health characteristics of the individual and on economic characteristics of the family, such as income.

Given the estimated propensity to experience episodes, the model simulates the actual occurrence of episodes for a family one at a time during a year. The episodes are generated assuming that they occur according to a Poisson process.[4] For each episode generated, the model determines the type of episode and the family member to whom it occurs based on the propensities for each family member to experience each episode type.

Once the model determines that an episode occurs, the total expenditure for the episode is simulated using expenditure equations estimated from the HIE data. The log expenditure of the episode is randomly generated from a normal distribution, with a mean that depends on the type of episode and the characteristics of the individual experiencing it.

The rate at which the family experiences episodes and, to a lesser extent, the cost of an episode depend on the effective coinsurance rate facing the family at that time. For example, if the insurance plan specifies a deductible, the effective coinsurance rate at the start of the year is 100 percent, and the occurrence of episodes is simulated assuming a 100 percent coinsurance. As a family experiences episodes during the year, the effective coinsurance rate may change. For example, when the family's cumulative expenditures exceed the deductible, the effective coinsurance rate will fall to the nominal coinsurance rate specified in the plan simulated. If the family's cumulative out-of-pocket expenditure exceeds the plan's out-of-pocket maximum, the effective coinsurance rate falls to 0 percent for the rest of the year. The model keeps track of the total expenditures and family out-of-pocket expenditures throughout the year as episodes are generated. As the family's expenditures cause the effective coinsurance rate to change, the rate at which episodes are generated and the predicted expenditure of episodes that occur are adjusted accordingly.

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that families who have an above-average propensity to experience hospital episodes (given the family-measured characteristics) also have an above-average propensity to experience outpatient acute and chronic episodes, and that the occurrence rates for the outpatient medical episodes are also correlated. The parameters of each of the distributions and the correlation structure across types of episodes were estimated from the HIE data, as described in Keeler et al. (1988).

[4]Because the episodes are assumed to be generated by a Poisson process, the time between episodes follows an exponential distribution, with a mean time equal to the inverse of the family Poisson propensity. The simulation model generates episodes by drawing from this distribution; the first draw gives the time from the beginning of the year to the first episode; subsequent draws date the time to the next episode until the year is complete.

Rather than directly adjust the Poisson rates to the effective coinsurance rate, the simulation model actually generates episodes for the family assuming no cost sharing by the family, then randomly censors episodes if the individual remains responsible for a share of the cost. The episode loss rate at nonzero cost sharing is equal to one minus the observed HIE occurrence ratio for the effective cost sharing relative to that of no cost sharing. The cost of the episode is predicted assuming no cost sharing and adjusted downward in cost if the family is responsible for a share of the cost. The procedure of censoring full-coverage episodes rather than changing the Poisson rates when the coinsurance rate changes has several advantages. First, it reduces the variance of the estimated difference in total expenditures between different insurance plans. Second, it allows us to realize catastrophic hospital episodes at the same rate irrespective of the effective coinsurance rates as we found in the HIE data; that is, when the model predicts a catastrophic hospitalization assuming full coverage, the hospitalization is not censored even if the effective coinsurance rate is greater than zero. Third, it also allows us to realize more hospital episodes when families are close to their out-of-pocket limit than when the amount of out-of-pocket expenditure remaining is high. The HIE results indicated that when families are within about $800 (in 1988 dollars) of their out-of-pocket limit, they experience only about 10 percent fewer episodes than if they were fully covered, in contrast to about 30 percent fewer episodes when the remaining out-of-pocket expenditure is higher. Details are included in Keeler et al. (1988).

## SIMULATION OF USE UNDER PROTOTYPE MANDATED EMPLOYER PLANS

The simulation model processes each family in an input database according to the above procedures and estimates the annual total and out-of-pocket expenditure for each person. We repeatedly process each sample of families and obtain estimates of mean expenditures from each replicate. We report confidence limits as the variability among the estimates. The number of replicates that we have run is 6 or 12, depending on the sample.

In order to capture the effects of the provisions concerning prenatal and infant care in the two prototypes and the 50 percent coinsurance rate for mental health benefits in Plan A, we needed to make some modest adjustments in the simulation model described in Keeler et al. (1988) because the model does not distinguish ambulatory mental health episodes from other ambulatory care episodes. Nor does it distinguish prenatal episodes of care.

Most ambulatory mental health episodes are chronic care episodes. Other analyses of HIE data showed that 8.8 percent of individuals with full coverage obtain mental health services in a year (Wells et al., 1982). This translates into an average rate of .088 mental

health episodes per year if each individual obtaining mental health services has one episode per year. The rate of all ambulatory chronic care episodes is .70 for patients with full coverage (Keeler et al., 1988). Thus we assume that 12 (.088/.70) percent of chronic care episodes are mental health episodes. When a chronic care episode occurs, we draw a uniform random variate and classify the episode as a mental health episode if the variate falls below .12. For Plan A, if the episode is a mental health episode, it is selected for occurrence assuming 50 percent coinsurance if the family is below the out-of-pocket limit, whereas other chronic episodes are selected assuming a 20 percent coinsurance.[5] We assume that the charges associated with a mental health episode are similar to the cost of other chronic episodes.[6]

We account for prenatal care in a similar fashion. Because most maternity care results in a hospitalization, prenatal treatment will be included in hospital episodes. We estimate that 40 percent of hospital episodes for women between the ages of 18 and 40 are for childbirth.[7] When a hospital episode is generated for a woman between the ages of 18 and 40, we classify it as maternity if a randomly selected uniform variate falls below .4; such episodes are assumed to be fully insured. The cost of a maternity episode is assumed to be similar to other hospital episodes for women in the age group.

We define an infant care benefit to cover children under age 2. The infant care benefit is accounted for in the simulation by treating well-care episodes of children age 2 or younger at the start of the year as covered in full.[8] Because our model processes a static database, newborns do not enter into the database as the year progresses. By including all episodes for children who are age 2 or younger at the start of the year, we are processing well-care episodes for approximately the number of children who would be age 2 or younger throughout the year, including newborns, even though some of the children in our database would actually age out of the well-care benefit during the course of the year.[9]

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[5]HIE analysis showed that the response of mental health use to changes in cost sharing is similar to the response of other ambulatory use.

[6]Data from the HIE suggest that mental health episodes are more costly than other episodes; log costs for mental health episodes are about 80 percent higher than other chronic episodes (Keeler et al., 1988; Keeler et al., 1986). We plan to incorporate an adjustment for differences in the size of the episode in future work, as described in Sec. VI of this Note. However, because mental health expenditures account for less than 10 percent of total health expenditures, we don't believe the simple assumption used here seriously distorts the estimates.

[7]From Keeler, Buchanan, and Rolph (1988) and Leibowitz (forthcoming).

[8]For all others, we assume that the patient must pay for well-care episodes.

[9]Also, we experience well-care episodes in families with a child who has in fact aged out of the benefit. These factors should have only limited effect on the estimates because well-care episodes for children do not affect the likelihood that the family will exceed the deductible or out-of-pocket limit.

## SIMULATION OF USE WITH BASELINE COVERAGE

Simulation of the health care use given by the prototype packages informs us about the change in employers' liability for the health care costs of workers. However, to estimate the effect of mandated benefits on the demand for health resources, we also need estimates of the current health use of persons who would be affected by the legislation. Because some of the affected workers and their dependents have no health insurance protection, we use the episode simulation model assuming 100 percent coinsurance to estimate the current, or baseline, use of these individuals.

Others who would be affected by proposed legislation do have some protection. Some of these purchase individual policies, some are covered by Medicaid or other government programs, while others are covered by the employer-group plan offered by another family member's employer. To simulate baseline use, we need information on the extent of coverage held by these individuals.

We use measures developed in the HIE to characterize the generosity of coverage of persons who purchase individual policies and use this information in simulating the baseline usage of those who are covered by privately purchased individual plans. The HIE collected detailed information about policies individuals held before enrolling in the experiment. Those data and the construction of a summary measure of the extent of plan benefits are described in Marquis (1986). One measure of plan benefits is the expected share of medical costs that the consumer will bear, given the plan provisions and the distribution of medical expenditures. For persons in the HIE sample with privately purchased insurance policies, this expected share was measured as 35 percent. In the simulation analysis, we therefore represent the baseline coverage of persons with individual policies as a plan with a 35 percent coinsurance rate for all services.

Persons affected by mandated-employment benefits who currently are covered by Medicaid or other public programs would likely continue in these programs because the benefits are more generous than the minimum mandated plan. Because coverage would remain the same, we expect health care use by those currently protected by public programs to remain unchanged.[10] Medicaid would realize some savings because it would become the secondary payor. Because Medicaid benefits are more generous than those in the mandated plans that we simulate, our estimates of health care use assuming the mandated plan benefits may understate the usage by those who also continue to have Medicaid protection. As a

[10]There may be income effects if these individuals earn more than $4.20 per hour and must pay a part of the premium for the employer plan.

result, we may also underestimate the employer's liability for these workers' health care costs. However, for several reasons, it is difficult to produce valid estimates of spending under Medicaid coverage using the episode simulation model. First, Medicaid is not a single program; access, eligibility requirements, and benefits differ widely from state to state. Second, the simulation model cannot account for restrictions on access—due to provider choice restrictions in some state programs or to limited provider participation—or the Medicaid reimbursement rates. Consequently, we have estimated the employers' cost of providing benefits for this subgroup as if the individual faces the mandated benefits. Our estimates of the effect on health care costs assumes no change in use by this subgroup.

Finally, for some workers, the new coverage through their own employer would duplicate benefits they now have through another family member's employer group. The legislation requires workers to participate in their own employer's plan. The total effect on employer liability for health care costs, on the shift between industries in the burden of workers' health care costs, and on health care spending depends on the benefits these workers currently have, whether they elect to continue duplicate coverage, and the share of the premium paid by the employer and employee for the duplicate coverage. If the employee does not continue to participate as a dependent in another plan, the added cost for the employee's plan would be approximately offset in reduced cost to the employer of the other family member. The estimates presented here adopt this assumption. The estimated cost under the mandated plan is shown as a shift from one employer to another; total employer costs for health care are not affected by the new policies covering these individuals. We also assume that the benefits these individuals currently have as dependents are similar to the benefits of the mandated plan, so that health care spending is unchanged.

## IV. THE DATA

The database processed in the simulation is drawn from the HIE baseline sample in the six HIE study sites: Dayton, Ohio; Seattle, Washington; Fitchburg, Massachusetts; Franklin County, Massachusetts; Charleston, South Carolina; and Georgetown County, South Carolina.[1] The baseline sample was a random sample of each site's population, subject to the exclusion of the following groups: (1) persons age 62 and older; (2) those with incomes in excess of $25,000 in 1973 dollars (or $65,000 in January 1988 dollars)—this excluded 3 percent of the families contacted; (3) those eligible for the Medicare disability program; (4) those in jails or institutionalized for indefinite periods; (5) those in the military or their dependents; and (6) veterans with service-connected disabilities.

All families in the baseline sample were administered an in-person interview to collect information about the family composition, demographic and economic characteristics of family members, the health insurance coverage of each family member, and health status. The detailed information collected during the baseline interview makes the HIE baseline sample superior to other samples for purposes of simulating the utilization effects of mandated employee benefits, for several reasons. First, the baseline information includes detailed information about the individual's employment and any health insurance coverage obtained through the workplace or privately purchased. Unlike many other databases, the HIE data provide information on the extent of the individual's coverage, not just whether the individual is covered. With information about the extent of any privately purchased coverage held by the individuals before obtaining the simulated employer-based benefits, we can produce better estimates of the amount of demand induced by the legislation than would otherwise be possible. A second advantage of the HIE data is that the database contains details about the individual's health status that improve the accuracy of predictions about health services utilization.

The proposals under consideration would require each employer to provide health insurance for all full-time employees—defined as those working 17.5 hours or more a week. Spouses and dependents of these employees would also be covered, unless they were insured by other employment-based plans. To represent the population that would be affected by the

[1]The baseline sample provided the frame for selecting families who were subsequently offered the opportunity to enroll in the experimental phase of the study. Data from the experimental phase of the study were used in developing the simulation model.

legislation, we selected from the HIE baseline sample all employed individuals who did not have health insurance coverage through their own employee group and individuals without employment-based coverage who were the spouse or dependent of a worker.[2] We used current estimates of the total number of individuals who would be affected by mandated employer benefit legislation to weight the sample and obtain total cost estimates. Separate weights for subgroups defined by current insurance status and employment status were used to adjust the HIE sample to the current profile of the affected population. The weights are based on estimates of the size of the affected population in various subgroups made by the Congressional Budget Office using the March 1987 Current Population Survey.[3] The HIE sample size, the estimated population size, and the resultant weights for each weight group are shown in Table 1. Each HIE sample person processed in the simulation analysis represents from 9,000 to 14,500 affected persons.

After adjusting to the weights shown in Table 1, other characteristics of the HIE sample do not differ markedly from those of the population of persons who would be affected by the proposed legislation. Tables 2 and 3 describe the sample processed in the simulation analysis. Table 4 contrasts the characteristics of workers in the HIE sample who have own-employer insurance with those of workers who would be affected by the proposed legislation. For a comparison of the characteristics of the HIE sample used for the simulation analysis with estimates of the characteristics of the population of persons who would be affected by the legislation, see Gramlich (1987) or Swartz (1988), who present distributions for the total population similar to those given in Tables 2 to 4.

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[2]The HIE baseline data did not include information on the hours per week worked. Thus all individuals 18 or older who reported working full- or part-time are included. However, whether or not they are employed, individuals under the age of 21 who are living with parents and report being financially dependent on the parent are assumed to remain covered by the parent's group policy if currently so covered or to be added to the parent's group policy if currently uninsured. The self-employed are excluded, as are the elderly.

[3]Gramlich (1987).

Table 1

DESCRIPTION OF DATABASE: SAMPLE SIZE AND WEIGHTS

| Persons Affected by Mandated Employer Benefit | HIE Sample Size | Population Estimate[a] (millions) | Weight (thousands) |
|---|---|---|---|
| Workers | | | |
| Uninsured | 827 | 12 | 14.5 |
| Insured by non-employment source | 543 | 8 | 14.7 |
| Insured by employer of another family member | 1,119 | 13 | 11.6 |
| Dependents | | | |
| Uninsured | 1,072 | 10 | 9.3 |
| Insured by non-employment source | 674 | 8 | 11.9 |

[a]Gramlich (1987).

Table 2

CHARACTERISTICS OF WORKERS AFFECTED BY MANDATED EMPLOYER BENEFITS

(percent)

| Characteristic | With Other Employer Coverage | With No Group Coverage |
|---|---|---|
| Industry | | |
| Construction | 4.3 | 10.1 |
| Nondurable Manufacturing | 7.4 | 6.0 |
| Durable Manufacturing | 5.6 | 7.0 |
| Transportation | 2.6 | 3.1 |
| Wholesale Trade | 2.6 | 3.1 |
| Retail Trade | 20.3 | 22.5 |
| Public Administration | 4.0 | 3.9 |
| Finance | 5.6 | 4.6 |
| Professional Services | 34.2 | 18.9 |
| Other Services | 12.5 | 17.8 |
| Other[a] | 0.9 | 3.0 |
| Total | 100.0 | 100.0 |
| Age | | |
| Under 25 | 12.1 | 29.6 |
| 25-34 | 31.4 | 29.9 |
| 35-44 | 23.1 | 15.3 |
| 45-54 | 22.8 | 15.6 |
| 55-64 | 10.6 | 9.6 |
| Total | 100.0 | 100.0 |
| Family Income[b] | | |
| Under $12,500 | 2.2 | 28.0 |
| $12,500-25,000 | 9.7 | 32.1 |
| More than $25,000 | 88.1 | 39.9 |
| Total | 100.0 | 100.0 |
| Hourly Wage Rate | | |
| Less than $4.20 | 13.8 | 22.0 |
| $4.20 or more | 86.2 | 78.0 |
| Total | 100.0 | 100.0 |
| Insurance Coverage | | |
| Medicaid/Public | — | 8.2 |
| Individual Policy | — | 30.9 |
| No Coverage | — | 60.9 |
| Total | | 100.0 |

[a]Agriculture, mining.
[b]January 1988 dollars.

Table 3

CHARACTERISTICS OF DEPENDENTS AFFECTED BY MANDATED EMPLOYER BENEFITS

(percent)

| Characteristic | Percent Affected Dependents |
|---|---|
| Industry of Head | |
| Construction | 12.0 |
| Nondurable Manufacturing | 7.3 |
| Durable Manufacturing | 11.6 |
| Transportation | 4.4 |
| Wholesale Trade | 2.9 |
| Retail Trade | 16.7 |
| Public Administration | 4.7 |
| Finance | 4.6 |
| Professional Services | 17.7 |
| Other Services | 16.4 |
| Other[a] | 1.7 |
| Total | 100.0 |
| Age | |
| Under 18 | 69.1 |
| 18-24 | 11.9 |
| 25-34 | 8.3 |
| 35-44 | 3.6 |
| 45-54 | 3.7 |
| 55-64 | 3.4 |
| Total | 100.0 |
| Family Income[b] | |
| Under $12,500 | 18.0 |
| $12,500-25,000 | 33.9 |
| More than $25,000 | 48.1 |
| Total | 100.0 |
| Insurance Coverage | |
| Medicaid/Public | 19.1 |
| Individual Policy | 24.7 |
| No Coverage | 56.2 |
| Total | 100.0 |

[a]Agriculture, mining.
[b]January 1988 dollars.

Table 4

EMPLOYED PERSONS BY HEALTH INSURANCE STATUS AND SELECTED CHARACTERISTICS

(percent)

| Characteristic | With Own-Employer Coverage | With Other Employer Coverage | With No Group Coverage | Total |
|---|---|---|---|---|
| All Workers | 71.0 | 11.5 | 17.5 | 100 |
| Industry | | | | |
| Construction | 56.5 | 9.5 | 34.0 | 100 |
| Nondurable Manufacturing | 84.3 | 7.0 | 8.7 | 100 |
| Durable Manufacturing | 89.8 | 3.5 | 6.7 | 100 |
| Transportation | 87.9 | 4.3 | 7.8 | 100 |
| Wholesale Trade | 74.3 | 9.0 | 16.7 | 100 |
| Retail Trade | 51.5 | 18.0 | 30.5 | 100 |
| Public Administration | 82.1 | 7.2 | 10.7 | 100 |
| Finance | 68.6 | 14.0 | 17.4 | 100 |
| Other Services | 39.9 | 18.8 | 41.3 | 100 |
| Professional Services | 66.5 | 18.2 | 15.3 | 100 |
| Other[a] | 34.7 | 10.7 | 54.6 | 100 |
| Age | | | | |
| Under 25 | 59.0 | 8.7 | 32.3 | 100 |
| 25-34 | 72.1 | 11.4 | 16.5 | 100 |
| 35-44 | 73.0 | 13.4 | 13.6 | 100 |
| 45-54 | 72.5 | 13.4 | 14.1 | 100 |
| 55-64 | 77.8 | 9.3 | 12.9 | 100 |
| Family Income[b] | | | | |
| Under $12,500 | 47.8 | 2.5 | 49.7 | 100 |
| $12,500-25,000 | 64.8 | 5.8 | 29.4 | 100 |
| More than $25,000 | 75.9 | 14.2 | 9.9 | 100 |
| Hourly Wage[b] | | | | |
| Less than $4.20 | 33.7 | 19.4 | 46.9 | 100 |
| $4.20 or more | 74.3 | 10.8 | 14.9 | 100 |

[a]Agriculture, mining.
[b]January 1988 dollars.

## V. RESULTS

### EMPLOYEES AND DEPENDENTS WITHOUT GROUP COVERAGE

Both of the prototype plans have very modest effects on total health care spending, although actual medical use does increase because the plans lower the patient cost sharing, which induces increased use. Our estimates of current spending, together with spending under the two prototype mandated plans by the 38 million employees and their dependents who are currently without group health insurance protection, are given in Table 5.[1] Under Mandated Plan A, health care spending increases about $1.3 billion, whereas the increase is about $2.5 billion under Mandated Plan B. This is less than a 1 percent increase in national health care spending, which now exceeds $400 billion.

Table 5

HEALTH CARE SPENDING UNDER MANDATED BENEFITS
BY EMPLOYEES AND DEPENDENTS CURRENTLY WITHOUT GROUP COVERAGE

| | Expenditure Per Person ($ per person) | | | Total Expenditure (millions of $) | | |
|---|---|---|---|---|---|---|
| | Current Expenditure | Mandated Plan A | Mandated Plan B | Current Expenditure | Mandated Plan A | Mandated Plan B |
| Total Spending | | | | | | |
| Employees | $843 | $883 | $922 | $16,855 | $17,645 | $18,416 |
| | (54) | (53) | (57) | (1091) | (1070) | (1142) |
| Dependents | 521 | 552 | 571 | 9,363 | 9,906 | 10,260 |
| | (42) | (50) | (55) | (757) | (905) | (1000) |
| Out-of-Pocket Spending | | | | | | |
| Employees | 573 | 236 | 256 | 11,453 | 4,714 | 5,109 |
| | (38) | (7) | (7) | (760) | (146) | (130) |
| Dependents | 333 | 140 | 157 | 5,989 | 2,531 | 2,826 |
| | (37) | (9) | (9) | (667) | (168) | (166) |

NOTE: Standard deviation, shown in parentheses, shows the variability between replicates in the estimate. Six replicates for each plan were generated. Out-of-pocket spending does not include premiums for privately purchased policies.

[1]All of the results are in January 1988 dollars.

For the individual, however, the mandated plans have substantial effects. Currently, individuals without employer group coverage pay more than 60 percent of their medical care directly out-of-pocket,[2] whereas under mandated plans the individual's share would fall to 25 percent.

Despite the higher initial deductible, we estimate that health care expenditures increase by a greater amount under Mandated Plan B than under Mandated Plan A. Under Plan A, families continue to pay a share (20 percent) of the cost of care above the initial deductible until out-of-pocket spending exceeds $3000. Under Plan B, there is no cost sharing above the initial deductible. The lower limit on family out-of-pocket spending in Plan B results in substantially more families exceeding the limit; these families then respond in their expenditure patterns to the zero cost sharing rate for the remainder of the year.

Table 6 shows the expected reimbursement by the insurer under the two plans. The reimbursement is less than total spending because the employee must pay the initial deductible and, in the case of Plan A, a 20 percent coinsurance on additional costs up to the catastrophic limit. For an actuarially fair insurance policy—one with no loading charge for administration or risk—the reimbursements would equal the premium. Total premium payments for Mandated Plan A are estimated at $19.4 billion and at $19.7 billion for Plan B. For Mandated Plan A, this entails is a $536 premium for single coverage and a $1354 premium for family coverage. For Plan B, the premium for single coverage is $540, and the premium for family coverage is $1383.

Current proposals require that employers pay the premium in full for employees earning less than $4.20 per hour; employers would be required to pay at least 80 percent of the cost of the plan for other workers. Looking at Table 6, the additional employer health insurance costs for employees and dependents currently without group coverage would be $16.3 billion under Plan A ($2.8 billion for employees earning less than $4.20 per hour plus $1.1 billion for their dependents; plus 80 percent of the aggregate of $9.7 billion and $5.8 billion for other employees and their dependents, or $12.4 billion). The additional costs would be $16.6 billion under Plan B. The average employer contribution for single coverage is about $460; for family coverage, the average employer contribution is about $1150.

Our estimate that the employer contribution for new policies would be $16 to $16.5 billion falls below other estimates that have been made. The Congressional Budget Office

[2]The remainder is covered by individual policies and Medicaid.

Table 6

INSURANCE PLAN REIMBURSEMENT UNDER MANDATED BENEFITS TO EMPLOYEES AND DEPENDENTS CURRENTLY WITHOUT GROUP COVERAGE

| | Reimbursement Per Person ($ per person) | | Total Reimbursement (millions of $) | |
|---|---|---|---|---|
| | Mandated Plan A | Mandated Plan B | Mandated Plan A | Mandated Plan B |
| Employees | | | | |
| Wage Less | $619 | $624 | $2,789 | $2,812 |
| $4.20/hr | (197) | (213) | (890) | (960) |
| Wage Over | 628 | 649 | 9,720 | 10,029 |
| $4.19/hr | (23) | (30) | (357) | (462) |
| Dependents | | | | |
| Head's Wage Less | 337 | 332 | 1,053 | 1,039 |
| $4.20/hr | (48) | (51) | (150) | (161) |
| Head's Wage Over | 394 | 395 | 5,841 | 5,860 |
| $4.19/hr | (57) | (64) | (845) | (946) |

NOTE: Standard deviation, shown in parentheses, shows the variability between replicates in the estimate. Six replicates for each plan were generated.

estimated this figure at $22 billion (Gramlich, 1987), and others have produced estimates of $35 to $40 billion (Gladwell, 1988). There are several explanations for the difference. First, we are reporting estimates of an actuarially fair premium, whereas insurers would charge a premium that includes a margin to protect them against risk as well as to cover administrative costs. Trapnell (1987) estimates that the average cost of administering small groups is about 20 percent; he also states that insurers often add another 5 to 10 percent risk charge. Inflating our numbers by 25 percent, we estimate the employer contribution to be $20 billion—a figure quite comparable to the Congressional Budget Office estimate.

Another difference between our estimate and others is that our figures are based on estimates of the utilization of employees and dependents who are currently uninsured; other estimates are based on the premiums that are now paid for employer-provided coverage. That is, our premiums reflect the experience of those who are currently uninsured, whereas the other estimates reflect the experience of those who are insured. The demographic

composition of the uninsured would lead us to expect them to use fewer services, even with the same level of coverage as other individuals. Lack of insurance coverage stems in part from choice behavior; those who elect to waive coverage may be persons who don't expect to need coverage because their health spending is low.

A third source of difference is that our estimates are in January 1988 dollars. Trapnell (1987) suggests that because of accelerating medical price increases in 1987, many insurers began incorporating trend factors of 16 to 20 percent in adjusting premiums. Our estimates do not include these trend adjustments.

Table 7 summarizes the effects of the two prototype plans on spending for health care by employees, employers, and the government. Employers would spend about $16 billion on new policies ($20 billion after adding the risk margin and administration costs). Employees' direct out-of-pocket spending would fall about $10 billion. Assuming that privately purchased policies were not retained, families would actually spend less in premium payments; the $2.3 billion reduction reflects the difference between estimated current payments for privately purchased policies and the employees' share of the premium of the mandated plan. Government outlays for health care would also fall because the new employment-based insurance would cover some services currently paid for by Medicaid and other government programs; we estimate the reduction in government spending to be about $2.3 billion.[3]

Any decision about insurance plans involves a tradeoff between the gains from risk reduction and the losses from inappropriate incentives for the purchase of more health care. Individuals are generally assumed to value reductions in financial risk; by reducing risk, more health insurance increases social well-being. However, increases in insurance coverage increase the amount of medical care demanded (the moral hazard). Because the consumer would not have purchased this additional care at the full market price, there is a welfare loss. The last two rows in Table 7 provide indicators of this tradeoff. The loss due to moral hazard reflects the difference between the total cost of the additional care that would be purchased if the mandated plans were legislated and the amount that consumers would be willing to pay for the care.[4] The measure of the gain in reduced risk is proportional to the reduction in the variance of out-of-pocket expenditures.[5] For both plans,

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[3]A reduction in government revenues would offset somewhat the reduction in government outlays because employer-paid premiums are a fully tax-deductible expense; this offset is not included in our estimate.

[4]The calculation of the loss is detailed in Keeler, Buchanan, Rolph et al. (1988).

[5]The calculation is also given in Keeler, Buchanan, Rolph et al. (1988). It uses Pratt's (1964) measure of the risk premium as r. var(x)/2, where x represents spending on medical care and r measures risk aversion. The difference between the risk premium in the

Table 7

SUMMARY OF EFFECTS OF MANDATED PLANS FOR EMPLOYEES AND DEPENDENTS CURRENTLY WITHOUT GROUP COVERAGE

| Change in: | Dollars per Person | | Total Dollars (millions of $) | |
|---|---|---|---|---|
| | Mandated Plan A | Mandated Plan B | Mandated Plan A | Mandated Plan B |
| Total Expenditure | $35 | $62 | $1,333 | $2,335 |
| Out-of-Pocket Expenditure | -270 | -251 | -10,197 | -9,506 |
| Premium: | | | | |
| Employer | 429 | 436 | 16,291 | 16,562 |
| Employee | -62 | -60 | -2,397 | -2,331 |
| Government | -62 | -62 | -2,363 | -2,388 |
| Loss Due to Moral Hazard | 30 | 59 | 1,141 | 2,257 |
| Gain in Reduced Risk | 1698 | 1701 | 64,182 | 64,335 |

the reduced uncertainty is substantial, with little loss to society from the induced demand. Because high-expenditure cases in the uninsured population are often treated as uncompensated care, the estimates inevitably overstate the real reduction in risk.

Table 8 shows how the increased $16 billion expenditure by employers is distributed among different industries. About half of the increased spending falls on the retail trade and services sector; these industry groups currently provide health insurance to a smaller share of employees than other sectors and account for the largest number of employees without protection.

base plan and the mandated plan is the gain; the gain therefore reflects the degree to which variance in spending, or uncertainty, is reduced. The risk parameter used in the calculation is .001; an individual with risk parameter .001 would pay $620 to insure against a 50 percent chance of losing $1000 and a 50 percent chance of no loss.

Table 8

CHANGE IN EMPLOYER EXPENDITURES FOR HEALTH INSURANCE BY INDUSTRY FOR EMPLOYEES AND DEPENDENTS CURRENTLY WITHOUT GROUP COVERAGE

(millions of dollars)

| Industry | Mandated Plan A | | Mandated Plan B | |
|---|---|---|---|---|
| | Change | Std. Error | Change | Std. Error |
| Construction | $1674 | $465 | $1756 | $527 |
| Nondurable Manufacturing | 1247 | 381 | 1355 | 514 |
| Durable Manufacturing | 1330 | 447 | 1350 | 480 |
| Transportation | 520 | 223 | 503 | 262 |
| Wholesale Trade | 535 | 291 | 544 | 299 |
| Retail Trade | 3166 | 815 | 3171 | 810 |
| Public Administration | 524 | 191 | 552 | 187 |
| Finance | 660 | 245 | 646 | 259 |
| Professional Services | 3043 | 900 | 3015 | 864 |
| Other Services | 3144 | 241 | 3192 | 266 |
| Other | 444 | 310 | 474 | 346 |

**EMPLOYEES INSURED BY ANOTHER FAMILY MEMBER'S EMPLOYER**

Current proposals before Congress require all employees to receive their primary health insurance coverage from their own employer. Thus the proposals would require the 13 million employees who waived insurance from their own employer in preference for coverage under another family member's employer to enroll in their own group plan.

By assumption, this transfer would have no effect on total health care spending or on the aggregate premiums employers pay. However, this transfer would shift premium payments from one employer to another. Table 9 shows how the cost of the mandated plans is distributed among different industries when this shift is taken into account. The total cost to all employers remains at $16 to 16.5 billion. Employees who currently are covered under other family member's group plan are predominantly women employed in retail trade or the services industries. Therefore, the incremental health care costs in these industries is about 30 to 40 percent higher when we require employees with group coverage from another group to enroll in their own group plan. The incremental costs in other industries, of course, falls accordingly.

Table 9

CHANGE IN EMPLOYER EXPENDITURES FOR HEALTH INSURANCE BY INDUSTRY FOR EMPLOYEES WITHOUT OWN GROUP COVERAGE AND FOR UNINSURED DEPENDENTS

(millions of dollars)

| | Mandated Plan A | | Mandated Plan B | |
|---|---|---|---|---|
| Industry | Change | Std. Error | Change | Std. Error |
| Construction | $1623 | $338 | $1714 | $331 |
| Nondurable Manufacturing | 359 | 930 | 444 | 1153 |
| Durable Manufacturing | -725 | 672 | -781 | 763 |
| Transportation | 104 | 300 | 115 | 393 |
| Wholesale Trade | 235 | 242 | 243 | 280 |
| Retail Trade | 4714 | 1099 | 4790 | 1154 |
| Public Administration | 159 | 291 | 139 | 254 |
| Finance | 985 | 413 | 990 | 469 |
| Professional Services | 4394 | 1193 | 4348 | 1065 |
| Other Services | 4023 | 385 | 4081 | 404 |
| Other | 418 | 434 | 447 | 478 |

## VI. CONCLUSIONS AND RESEARCH AGENDA

Mandating that employers provide health insurance coverage to all workers and their dependents would add about 38 million individuals to employers' group insurance plans. While we estimate that mandated benefits similar to proposals under consideration would have only a modest effect on total health care spending, this legislation would cost employers more than $16 billion in additional health insurance premium payments on behalf of employees. The additional costs fall primarily on the retail trade and services industries; the additional burden on these industries is exacerbated by proposals that require employees to elect their own group coverage rather than another family member's plan.

The behavioral model that we use in our estimation is based on the response of individuals to varying levels of cost sharing in insurance policies in the fee-for-service system. However, it is likely that many employers will offer enrollment in prepaid plans as a means of controlling use and costs. Others may offer enrollment in Preferred Provider Organizations that attempt to channel patients to the cost-effective providers. If employers are successful in enrolling the newly insured in alternative health plans and if the alternative plans are successful in containing use and costs, our estimates will overstate the increase in total health spending and the increase in the cost to employers of mandated minimum health benefits.

On the other hand, several factors may lead us to understate costs. First, the estimation model uses data collected during the period 1974 to 1982. While we have adjusted for inflation in prices since that time, our estimation does not incorporate a factor for technological advances that might affect the intensity of care delivered.

Second, the input database characterizes individuals who were uninsured in the middle 1970s. Because the proportion of workers who are uninsured has increased since that time, the uninsured today may be on average less healthy than the uninsured in the input database. To the extent that being uninsured is self-selected, those who select to be uninsured are likely to be healthier than those who do not. The first individuals who select to be uninsured will be the healthiest and therefore, as the size of the group grows, the new entrants will be less healthy than the first individuals.

Third, some of the proposals would mandate that employers provide more generous coverage for some services than is standard in most policies, for example, coverage in full for maternity and child health care. If these changes affect physician practice norms or standards, our estimates also understate the total effect.[1]

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[1]However, Newhouse and Marquis (1978) find little evidence to support the norms hypothesis.

Finally, we have assumed that none of those in the population affected by the legislation will supplement the benefits of their group plan by retaining duplicate coverage through another family member's policy or by retaining individually purchased coverage. If they do, use will be higher than we have estimated because employees will face a lower coinsurance rate than we have assumed. Because the group plan pays a part of the additional use, employers' costs will also be higher than we have estimated.

The estimates presented in this Note have focused only on employees and their dependents who currently do not have group coverage from their own employer. Minimum mandated benefits will also expand coverage to some workers with less than the minimum protection, with added cost to employers.

In coming months, we plan to modify our methodology to address some of these issues and to carry out additional estimation. We plan to add two types of modifications to the model; (1) changes in the generation of episodes and (2) changes in the input database.

## CHANGES IN THE GENERATION OF EPISODES

Most insurance proposals specify special treatment for prenatal and well-baby care and for mental health care. However, the episode simulation model does not distinguish maternity episodes from other episodes, nor does it distinguish mental health episodes from other ambulatory care episodes.

For the initial cost estimation, we adopted a crude adjustment procedure to generate mental health and maternity episodes, as described in Sec. III. We randomly classified chronic care episodes as mental health episodes, using a constant rate for everyone in the population. Similarly, we randomly classified hospital episodes as maternity episodes, using a constant rate for all women between the ages of 18 and 40. Although we plan to use the same approach in future estimation, we will undertake some additional analysis of the HIE data to develop rates for classifying episodes that vary with the demographic characteristics of the individual experiencing the episode.

We also assumed that charges associated with maternity episodes are similar to the cost of other hospital episodes and that charges for a mental health episode are similar to the costs of other chronic conditions. We plan to compare the relative size of these episode types for various demographic subgroups to develop adjustment factors for the episode costs, depending on its classification. These adjustment factors may also vary with the demographic characteristics of the individual experiencing the episode.

A third planned adjustment is to incorporate a technological enrichment factor to take account of any changes in the intensity of episodes that have occurred since the HIE data were collected. We plan two methods for estimating this factor. One method will look at trends in intensity over the period of time during which the HIE was carried out and will project the trend to the current period. Another method will use measures of intensity changes developed for the National Health Expenditure projections. See, for example, Freedland and Schendler, (1983).

The episode model was carefully tested when it was originally developed. We have also done some retesting of the components of the model that we adjusted for this cost estimation. We plan a careful revalidation when we have completed the changes in episode generation described above. We will construct plans similar to the HIE plans. By processing a part of the HIE sample, we can then compare the average numbers of episodes of various types generated by the model with the actual HIE experience of these sample persons.

## CHANGES IN THE INPUT DATABASE

In the next phase, we plan to include estimates of the cost of expanding the benefits of employees and their dependents whose coverage is below the minimum mandated. To do this, we need to estimate the size of the population, construct the structure of their current plan, and simulate experience under the current and minimum mandated plan benefit structures.

We will use the HIE data about insurance coverage from the initial interview to estimate the size of this group and to characterize their current coverage. To determine who is in the population, we will calculate the expected share of the medical bill to be reimbursed under the individual's current coverage and choose individuals in the HIE sample whose expected share, or average reimbursement rate, is below the expected reimbursement share under the minimum mandated plan. For the two prototypes that we have studied, the plans reimbursed, on average, about 70 percent of medical expenses (see Tables 5 and 6 in Sec. V). In the HIE data, 8.9 percent of employees with group insurance coverage had policies under which they and their covered dependents could expect to be reimbursed, on average, for less than 70 percent of their medical bills.[2] If we assume that this rate holds in the national population—unfortunately, there are no studies to allow us to determine this—these

[2]The construction of this measure is described in Marquis (1986).

employees and their dependents represent 24.5 million individuals with benefits below the minimum.

Measures constructed from the HIE insurance data collection include the initial deductible for hospital benefits and for physician care and the expected out-of-pocket payment for various percentiles of the expenditure distribution. We use these measures to characterize the current coverage as a policy with an initial deductible and with a sliding scale of coinsurance rates.[3]

We will develop similar characterizations of the current coverage for individuals without group coverage who purchase private policies. The present estimate of the change in expenditure by these individuals represents their current coverage as a constant cost-sharing rate. We will also use the insurance data to construct the baseline coverage for employees who are currently covered under another family member's group plan and test the sensitivity of our results to alternative assumptions about whether these individuals retain duplicate coverage.

The details on current insurance coverage and on health status in the HIE database offer a rich database for producing the cost estimates. When weighted to national estimates of the size of the uninsured population, the distribution of characteristics in the HIE sample does not differ markedly from a national sample. However, the HIE was not a national sample and was taken more than 15 years ago. A version of the simulation model that uses only the demographic characteristics available from the Current Population Survey is available. Therefore, as a test of the ability to generalize the estimates made using the HIE sample, we will also process a nationally representative sample from the Current Population Survey. We will compare the estimates derived from the two databases.

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[3]In the preliminary estimation work reported in this Note, we attempted to obtain estimates for this underinsured group by characterizing the current coverage with a single parameter—namely, the expected or average coinsurance rate over the entire distribution of medical expenditures. Typically, however, this average coinsurance rate reflects high levels of consumer cost sharing at the front end, with lower cost sharing at higher spending levels. Because initial deductibles exert a strong restraining effect on demand, our estimates with constant cost sharing produced some anomalous results. Consequently, we need to construct a more realistic characterization of the current coverage before making these estimates.

## REFERENCES

Freedland, Mark, and Carol Ellen Schendler, "National Health Expenditure Growth in the 1980s: An Aging Population, New Technologies, and Increasing Competition," *Health Care Financing Review*, Vol. 4, No. 3, March 1983, pp. 1-58.

Gladwell, Malcolm, "Health Proposal's Unanswered Questions," *The Washington Post*, 29 September 1988, p. c1.

Gramlich, Edward M., "Statement Before the Committee on Labor and Human Resources, United States Senate," 4 November 1987.

Keeler, Emmett B., Joan L. Buchanan, John E. Rolph, et al., *The Demand for Episodes of Medical Treatment in the Health Insurance Experiment*, The RAND Corporation, R-3454-HHS, March 1988.

Keeler, Emmett B., and John E. Rolph, *The Demand for Episodes of Medical Treatment*, The RAND Corporation, R-2829-HHS, December 1982.

Keeler, Emmett B., Kenneth B. Wells, Willard G. Manning, et al., *The Demand for Episodes of Medical Health Services*, The RAND Corporation, R-3432-NIMH, October 1986.

Leibowitz, Arleen, *The Response of Births to Changes in Health Care Costs*, The RAND Corporation, forthcoming.

Leibowitz, Arleen, Willard G. Manning, and Joseph P. Newhouse, *The Demand for Prescription Drugs as a Function of Cost-Sharing*, The RAND Corporation, N-2278-HHS, October 1985.

Manning, Willard G., Joseph P. Newhouse, Naihua Duan et al., "Health Insurance and the Demand for Medical Care," *American Economic Review*, June 1987.

Marquis, M. Susan, *Characteristics of Health Insurance Coverage: Descriptive and Methodological Findings From the Health Insurance Experiment*, The RAND Corporation, N-2503-HHS, August 1986.

Monheit, Alan C., et al., "The Employed Uninsured and the Role of Public Policy," *Inquiry*, Winter 1985, pp. 348-364.

Newhouse, Joseph P., and M. Susan Marquis, "The Norms Hypothesis and the Demand for Medical Care," *Journal of Human Resources*, Vol. XIII Supplement, 1978, pp. 159-182.

Pratt, John W., "Risk Aversion in the Small and in the Large," *Econometrica*, Vol. 32, No. 1-2, 1964.

Regula, Ralph, "National Policy and the Medically Uninsured," *Inquiry*, Spring 1987, pp. 48-56.

Swartz, Katherine, *The Uninsured and Workers Without Employer-Group Health Insurance*, 3789-02, The Urban Institute, Washington, D.C., August 1988.

Taylor, C. d'Arc, S. M. Polich, and E. M. Sloss, *HIE Reference Series, Volume 3: User's Guide to HIE Data*, The RAND Corporation, N-2349/3-HHS, August 1987.

Trapnell, Gordon R., "Premiums for Employer Minimum Insurance Coverage," testimony before the U.S. Senate Subcommittee on Labor and Human Resources, 4 November 1987.

Wells, Kenneth B., Willard G. Manning, Jr., Naihua Duan, et al., *Cost Sharing and the Demand for Ambulatory Mental Health Services*, The RAND Corporation, R-2960-HHS, September 1982.