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PREVENTIVE CARE, CARE FOR CHILDREN AND NATIONAL HEALTH INSURANCE

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ABSTRACT

The purpose of this paper is to examine issues related to the coverage of preventive care under national health insurance. Four specific kinds of medical care services are included under the rubric of preventive care: prenatal care; pediatric care, dental care, and preventive physicians' services for adults. We consider whether preventive care should be covered under national health insurance, and if so what is the nature of the optimal plan. Our review of the literature on the effects of medical care on health outcomes suggests that prenatal care and dental care are effective, but pediatric care (except for immunizations) and preventive doctor care for adults are not. Moreover, health outcomes in which care is effective correspond to outcomes in which income-differences in health are observed. These empirical results and the theory of health as the source of consumption externalities indicate that the optimal NHI plan should be characterized by benefits that fall as income rises. In additon, the plan should be selective rather than general with respect to the types of services covered.

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PREVENTIVE CARE, CARE FOR CHILDREN, AND NATIONAL HEALTH INSURANCE

Gilbert R. Ghez and Michael Grossman*

The numerous plans for national health insurance (NHI) introduced during the 1970s have emphasized the extension of coverage to two types of services where private health insurance benefits are thought to be lacking or inadequate: medical care services associated with catastrophic illness and medical care services with a large preventive component. Included in the latter category are prenatal care, pediatric care (care rendered by all physicians to children and adolescents), preventive check-ups, and dental care. Although some bills introduced in Congress during the Nixon-Ford Administration focused solely on catastrophic illness, most of them, including those supported by the Administration, contained benefits for preventive care. For example, the Mills-Schneebeli-Packwood Bill, introduced in 1974 and endorsed by the Nixon Administration, provided benefits subject to a deductible of $150 per person and a coinsurance rate of 25 percent for prenatal and maternity care, well-child care to age six, dental care to age thirteen, and vision and eye examinations to age thirteen.[1/] Preventive check-ups for adults were excluded from the basic benefits, but the provisions of the bill to stimulate enrollment in prepaid group health plans (health maintenance organizations) would have resulted in an increase in the percentage of the population insured for this service. Other bills, most notably those associated with Senator Kennedy, were even more liberal with respect to the coverage of preventive medical care. While phase one of President Carter's recent national health insurance plan

focuses on catastrophic illness, pregnant women and infants up to the age of one would be guaranteed free care regardless of family income.[2/] Presumably, coverage would be extended to other types of preventive care after the initial phase-in period. Governor Brown has recently advocated an all-out emphasis on prevention.

The purpose of this paper is to examine issues related to the coverage of preventive care under national health insurance. In particular we try to answer two basic questions. Should preventive services be covered? If so, what is the nature of the optimal plan? As part of the second question, we investigate whether coverage should be universal or limited both with respect to which groups in the population are insured and which preventive services are covered. In order to deal with these two basic issues, several other issues must be addressed. In Section I of the paper, in an effort to shed light on the extent of "underinsurance," we discuss the extent of present third-party (private and public) coverage of preventive medical care services. In Section II we review the literature on the effects of preventive medical care on health outcomes. Clearly this review is relevant since one of the goals of coverage of preventive care under NHI is to improve the health of the population. In Section III we review the literature on the determinants of utilization of preventive medical care services. Here our focus is on the effects of variables that are under the purview of public policy (price, income, and health manpower) and on variables whose effects government policy might try to offset (socioeconomic and family characteristics). Implications for an optimal plan are treated in Section IV.

Before turning to the main issues in the paper, it will be helpful to discuss several conceptual issues. These revolve around the definition of preventive care, the types of medical services included under the rubric of preventive care, and the appropriateness of insuring this care. We define preventive care activities as activities or inputs that may improve health by reducing the probability of an illness or an accident or that reduce the seriousness of an illness or an injury given the occurrence of an unhealthy state. Preventive care is efficacious if there exists a course of action that can be taken after detection of an adverse symptom that will reduce the need or extent of later treatment. Whether preventive care is efficacious or not is a medical question. Preventive care is said to be effective if a unit of preventive activity by an individual improves his later health. Effective preventive care requires adequate symptomatic identification, efficaciousness and compliance with the prescribed course of action. Hence effectiveness is a stricter requirement than efficaciousness.

Preventive activities are <u>not</u> limited to medical care. Indeed, a good deal of evidence suggests that preventive nonmedical activities have much larger impacts on health than medical care. We refer here to the importance in favorable health outcomes of behaviors or life styles associated with proper diet, exercise and recreation, refraining from smoking cigarettes, avoiding alcohol abuse, and years of formal schooling completed.[3/] By and large, we deal with preventive medical care in this paper, but the reader should not lose sight of the extremely important role of nonmedical factors in health outcomes.[4/]

We include four specific kinds of medical care services under the rubric of preventive care. These are prenatal care; pediatric care (preventive and curative physicians' services delivered to children and adolescents); preventive physicians' services delivered to adults under the age of 65 including physical examinations, multiphasic screening, and associated X-rays and laboratory tests; and dental care delivered to children, adolescents, and adults under the age of 65. To keep the paper manageable, we do not consider preventive care for persons age 65 and over and therefore do not discuss issues related to the Medicare program. We focus on the medical services just indicated because they are all thought to have an important preventive component. This is obvious in the case of preventive physicians' services for adults. In the case of children and adolescents, both preventive and curative services delivered early in life can have important long-run effects on health in adulthood. Moreover, the appropriate treatment of problems revealed by an annual check-up is an integral component of preventive care. The importance of prevention is underscored by making periodic check-ups required in schools, in the armed forces, and sometimes at the place of work.

The alleged importance of the early period of life in health outcomes has led Newberger, Newberger, and Richmond; Keniston and the Carnegie Council on Children; and Marmor to propose that national health insurance should be limited at least initially to rather complete coverage of prenatal care, pediatric care, dental care for children, and in some instances catastrophic illness.[5/] Bills limiting national health insurance solely to mothers, infants, and children were introduced in

Congress in 1976 by Senator Javits and Congressman Scheuer. The content of our paper reflects the legislative and policy interest in preventive care for children; the paper contains a selective, rather than a comprehensive, discussion of preventive care for adults.[6/] To keep the paper manageable and because of the key role of the physician in the medical care market, we do not deal with hospital care for children. Also to keep the paper manageable, we do not treat in any detail the preventive component of adult remedial care delivered in the early stages of illness, although we recognize that the benefits of prevention and intervention are perhaps greatest at this stage.

At first glance, it might seem somewhat anomalous to consider the coverage of preventive care under national health insurance. After all, the purpose of private insurance is to protect against uncertainty. That is, risk averse consumers have an incentive to purchase health insurance to finance medical outlays associated with illness and injury (unfavorable health outcomes or states of the world). In this context preventive care is a substitute for market insurance; it is a form of self-insurance or self-protection to use the terminology introduced by Ehrlich and Becker.[7/] Put differently, there is a good deal of uncertainty with respect to the scope and size of remedial medical care outlays but no such uncertainty with respect to preventive medical care outlays.

If the sole purpose of national health insurance were to provide protection against uncertainty and if the insurance scheme satisfied several conditions mentioned later in the paper, there would be no justification for covering preventive care. The key point to realize,

however, is that national health insurance has other goals in addition to reduction of risk. If its goals include improvements in the health of certain segments of the population or correcting suboptimal private decisions due to externalities, NHI itself and coverage of preventive care could be justified even if there were no uncertainty.[8/] We discuss theoretical justifications for coverage of preventive care under NHI and optimal intervention strategies in more detail in Section IV.

I. Extent of Coverage

A. Private Health Insurance Coverage

Panel A of Table 1 shows the percentage of the civilian population of the United States under age 65 with private insurance for three types of medical services in 1970 and in 1976. The three services are (1) doctor office and home visits, (2) X-rays and laboratory exams, and (3) dental care. Panel B shows the percentage of private expenditures for each service paid by health insurance. The percentage of expenditures covered is smaller than the percentage of persons covered because most health insurance policies contain deductibles, coinsurance rates, upper limits, and restrictions on, for example, the type of doctor office visits covered. The most notable trend in the table is the rapid increase in the percentage of the population with dental insurance from 6.6 percent in 1970 to 24.0 percent in 1976.

Preventive physicians' services delivered to children and adults take the form of vaccinations and immunizations, preventive check-ups, detailed physical examinations, and multiphasic screening. Although these services are associated with doctor office visits, X-rays, and laboratory tests, the coverage figures in Table 1 cannot be extrapolated

Table 1

PRIVATE HEALTH INSURANCE COVERAGE

Service Covered	1970	1976
Panel A. Percentage of Population Under 65 Years of Age with Private Health Insurance Coverage by Type of Service		
Doctor Office and Home Visits	48.0[a/]	62.2[b/]
X-ray and Laboratory Examinations	73.8[a/]	75.0[b/]
Dentist's Services	6.6[a/]	24.0[b/]
Panel B. Percentage of Private Expenditures Paid by Private Health Insurance by Type of Service		
Doctor Office and Home Visits for People under 65 Years of Age Note: includes X-rays and laboratory tests associated with office visits	22.1[c/]	28.6[d/]
Dentist's Services	3.8[c/]	14.9[e/]

a/ Source: Marjorie Smith Mueller, "Private Health Insurance in 1970: Population Coverage, Enrollment, and Financial Experience," Social Security Bulletin, vol. 35 (February 1972).

b/ Source: Marjorie Smith Carroll, "Private Health Insurance Plans in 1976: An Evaluation," Social Security Bulletin, vol. 41 (September 1978).

(continued on next page)

Footnotes to Table 1 (concluded)

c/ Source: Ronald Andersen, Joanna Lion, and Odin W. Anderson, Two Decades of Health Services: Social Survey Trends in Use and Expenditure (Cambridge, Mass.: Ballinger Publishing Company, 1976).

d/ Computed as follows:

K_{70}, K_{76} = percentages paid by insurance in 1970 and 1976, respectively.

I_{70}, I_{76} = percentages of population with private health insurance coverage in 1970 and 1976, respectively.

Assume $\frac{K_{76}}{I_{76}} = \frac{K_{70}}{I_{70}}$,

then $K_{76} = \frac{I_{76}}{I_{70}} \times K_{70}$

e/ Source: Robert M. Gibson and Charles R. Fisher, "National Health Expenditures, Fiscal Year 1977," Social Security Bulletin, vol. 41 (July 1978).

to these preventive services. This is because most health insurance plans do not cover preventive care.[9/] On the other hand, prepaid group practice plans, commonly termed health maintenance organizations (HMOs), do cover preventive physicians' services. In 1976 approximately 4 percent of persons with private doctor office visit insurance were members of prepaid group practice plans.[10/] It should be noted that fraud by physicians and patients can make insurance companies' exclusion from coverage of preventive services difficult to enforce. That is, in filling out an insurance claim, a physician can report that he delivered curative services when in fact he delivered preventive services. Although the extent of such fraud is not known, our own casual empiricism suggests it is not unimportant. Our own casual empiricism also suggests that dental insurance, especially the newer plans, do cover preventive check-ups subject to deductibles, coinsurance, and specified maximum payments.[11/]

According to the health survey conducted by the National Opinion Research Center and the Center for Health Administration Studies of the University of Chicago (the NORC survey), 51 percent of children between the ages of zero and five and 53 percent of children between the ages of six and seventeen had doctor office visit insurance in 1970.[12/] This insurance covered 13.6 percent of the private outlays on doctor office visits on behalf of the younger children and 20.7 percent of the private outlays on behalf of the older children. There is evidence that the NORC estimates of the percentage of children with doctor office visit insurance are too large. Unpublished data from the National Center for Health Statistics indicate that approximately one-third of all children had such coverage in 1972.[13/]

In 1970, 74 percent of all live births to women not eligible for Medicaid or other public funds were covered by private health insurance.[14] This insurance financed 49 percent of total private expenditures per live birth and 46 percent of obstetrical services delivered by physicians. Obstetricians typically charge pregnant women a flat fee for prenatal visits and the delivery of the child rather than a fee for each prenatal visit. Therefore, the figures just cited give a good indication of the extent of coverage for all physicians' services associated with births. Data on prenatal insurance coverage are not available for years after 1970, but Andersen, Lion, and Anderson report that such insurance increased over time between 1963 and 1970.[15]

To summarize, preventive physicians' services for children and adults are not usually covered by private health insurance except in the case of prepaid group practice plans. Between one-third and one-half of all children have doctor office visit insurance, most of which finances curative (remedial) medical care services. The percentages of the population with prenatal and dental insurance have risen substantially over time.[16]

B. Public Coverage

The main public sources of coverage for the medical care services considered in this paper are Medicaid, the maternal and child health program, and the neighborhood health center program.[17] All of these programs are aimed primarily at low-income families. Of the three programs, Medicaid by far is the largest. In 1976, it accounted for approximately 95 percent of total public expenditures on the three programs combined.[18]

The Medicaid program was enacted in 1965 as Title XIX of the Social Security Act. It is a joint Federal-state program designed to finance the medical care services of specified groups of needy persons. Medicaid eligibility is linked to welfare eligibility. States that elect to participate in the program (all states except Arizona have elected to do so) must cover all families covered by the aid to families with dependent children (AFDC) program.[19/] States may also provide Medicaid coverage to the medically needy. These are persons whose incomes net of medical expenses are 133 1/3 percent or less of the AFDC eligibility income level in each state. Twenty-eight states provide coverage for the medically needy. In twenty-six states AFDC is restricted to families without a father present in the home. Twenty-four states extend AFDC and Medicaid coverage to families with unemployed fathers who do not receive unemployment compensation. Seventeen states cover all children under the age of twenty-one in families with incomes below the AFDC eligibility level, regardless of the employment status of the parents or the family composition.

It is well known that AFDC income eligibility levels vary considerably among states. This factor, together with the factors mentioned above, causes a considerable percentage of low-income persons to be ineligible for Medicaid. In 1970 Davis and Schoen estimate that 45 percent of the poverty population of children under age twenty-one and 39 percent of the poverty population of adults between the ages of twenty-one and sixty-four did not receive Medicaid benefits.[20/]

In some states Medicaid recipients are eligible for benefits for all four medical care services discussed in this paper: prenatal and

obstetrical care, pediatric care, preventive physicians' services for adults, and dental care. All states must cover physicians' services. Coverage of dentists' services is optional, and in 1974 only 16 percent of all white persons covered by Medicaid and 15 percent of all nonwhite persons covered saw a dentist.[22] Although Medicaid is characterized by the absence of deductibles and coinsurance, states can restrict the kind and amount of physicians' services covered in a number of ways. In twenty states single women pregnant with their first child are ineligible for prenatal and obstetrical care because the AFDC programs of these states do not cover "unborn children." Some states limit the number of physician office visits per person to a specified number per month or per year. Some states exclude routine physical examinations and screening for adults.[23] Moreover Medicaid does not cover the indirect costs of obtaining medical care: outlays on transportation and the value of the time spent in traveling, waiting, and obtaining information about alternative sources of care.[24]

In 1967 an early and periodic screening, diagnosis, and treatment (EPSDT) program was created under Medicaid. By July 1, 1969, all states were mandated to provide EPSDT services to children under the age of twenty-one who were eligible under the state's Medicaid program. The enactment of this program changed the nature of Medicaid from simply a payment mechanism to finance services to an active deliverer of services to poor children. States were required to seek out such children, advise them or their families of the availability of benefits, and ensure that they receive them.

The emphasis of the EPSDT program has been on screening. The screening examination must include a physical examination, provision of appropriate immunizations, vision and hearing tests, laboratory tests, and a dental examination for children three years of age and older. In fiscal 1977, 2.0 million children of an estimated Medicaid population of 11.0 million children received screening services. This increased the number of children with up-to-date assessments to 3.0 million.[25/]

The failure of Medicaid to cover all pregnant women and children in the poverty population and the failure of the EPSDT program to screen all children eligible for Medicaid has led the Carter Administration to propose the Child Health Assurance Program (CHAP). A bill to amend Title XIX of the Social Security Act to create CHAP was introduced in Congress in 1978 (HR 13611) and modified and reintroduced in 1979 (Hr 4053). To date, the legislation has not been enacted into law.

Under CHAP national income standards would be established for determining the eligibility of pregnant women and children for Medicaid. For pregnant women, the standard is $3,000, increased by $600 for each additional family member.[26/] For children, the standard is $2,400 for an individual (relevant for older children who do not live with their parents), $3,000 for a family of two, and an additional $600 for each additional family member. These uniform national standards would add 100,000 pregnant women to the Medicaid rolls and approximately 2 million children. States would be required to finance prenatal care for pregnant women and routine dental care for children.[27/]

Finally, funds are authorized to allow the EPSDT program's administrators to publicize the availability of these services. CHAP would increase the cost of Medicaid by roughly $400 million; this should be compared with total Federal and state expenditures on Medicaid of $14 billion in fiscal 1976.

With the exception of the EPSDT program, Medicaid is a mechanism for financing the medical care services of poor people rather than a mechanism for delivering these services. On the other hand the maternal and child health program (MCH) and the neighborhood health center program (NHC) focus both on delivery and on financing of services to poor people. The MCH program was created by Title V of the Social Security Act of 1935. In 1963 Title V was amended to include special grants for maternity and infant care (M and I) projects designed to provide adequate prenatal care. In 1965 Title V was further amended to include children and youth (C and Y) projects. These supply comprehensive medical care services in poverty areas.

In 1965 the program to create and fund neighborhood health centers was started by the Office of Economic Opportunity as part of the War on Poverty. By 1973 overall control of the centers had been shifted to the Bureau of Community Health Services of the U.S. Department of Health, Education, and Welfare. These centers provide ambulatory care services to all age groups in the population. In 1974 36 percent of registrants in NHCs were children below the age of fifteen, 45 percent of registrants were between the ages of fifteen and forty-four, 13 percent of registrants were between the ages of forty-five and sixty-four, and 6 percent were sixty-five or older (compared to 14 percent of the

elderly in the poverty population).[28] Hence children and adults not eligible for Medicare are the main recipients of services delivered by NHCs.

In both the MCH and NHC programs, funds are allocated directly to suppliers: state and local health departments; special clinics and centers for the medical care of pregnant women, infants, children, and youths; and neighborhood health centers. Note that suppliers are not physicians or dentists in private practice. Taken together, the MCH and NHC programs cover prenatal care, pediatric care, preventive physicians' services for adults, and dental care. But these programs are very small relative to Medicaid: in fiscal 1976 Medicaid outlays were nineteen times as large as outlays on the MCH and NHC programs.[29]

To summarize, a network of public programs exists to finance prenatal care, pediatric care, preventive physicians' services for adults, and dental care for the poverty population and to deliver these services to this population. This network has been criticized because it fails to cover a significant proportion of the poverty population and because it emphasizes financing rather than delivery. Nevertheless its existence should be kept in mind, particularly since we argue in Section IV that a convincing case can be made for limiting preventive care under national health insurance to low and moderate-income families.

II. Effects of Preventive Medical Care on Health Outcomes

In this section we discuss the effects of preventive medical care on health outcomes. We do not argue that in those instances where care is made effective it necessarily provides greater benefits than in cases

where care is less effective. After all benefits depend not only on the health outcome, however measured, but also on the value of a unit of improved health in the form of reduction in income loss or relief from pain and suffering. By concentrating on health outcomes rather than on measures of full benefit from care, we bypass the difficult issues of monetary valuation. Our aim is to distinguish those forms of care that are effective from those that are not. Our review of the literature on this subject is selective rather than comprehensive. Studies are cited to illustrate our main points.

A. Prenatal Care

There is a growing consensus that prenatal care is effective in terms of infant health outcomes, although its relative importance remains an open issue. Lewit reports that prenatal care, measured by the number of prenatal visits to physicians, is an important determinant of birth weight and neonatal mortality in the 1970 New York City birth and death cohort.[30/] He also reports that birth weight has a strong negative effect on postneonatal mortality, so that prenatal care has an indirect impact on postneonatal mortality. Based on interstate regression analyses of neonatal mortality rates for states of the United States for the years 1952, 1956, 1960, 1964, and 1968, Williams finds that the mortality rate is inversely related to the number of board certified obstetrician-gynecologists per birth.[31/]

In addition to the evidence on the effects of prenatal care in general, there is suggestive evidence in support of the effectiveness of selective public intervention strategies. With various socio-economic variables held constant, Williams shows that the infant

mortality rate is negatively related to expenditures per birth under maternal and infant care (M and I) projects in a subsample of states of the U.S. in 1966 and 1967.[32] Davis and Schoen summarize studies that point to dramatic declines in infant mortality rates over time in the late 1960s and early 1970s in areas serviced by M and I projects.[33] These declines exceeded those experienced by similar residents of the same city or county who were not serviced by the M and I project in their area. Davis and Schoen also point out that the infant mortality rate of blacks in Lee County, Mississippi, was cut in half between 1970 and 1974. This large decline followed the opening of a neighborhood health center in the county in 1970. Currently, the black infant mortality rate in Lee County is below the state average, "... a remarkable achievement considering that the county has the lowest educational level of any county in the state and one of the highest poverty rates."[34]

Since birth weight rises with prenatal care, the benefits of appropriate care are not limited to infant mortality outcomes. Birth weight has strong positive effects on intellectual development in samples of school-age children.[35] Moreover, Shakotko, Edwards, and Grossman find that health in adolescence is positively associated with intellectual development in childhood in a longitudinal sample.[36] Since they control for health in childhood, the finding implies causality from IQ to health. It means that birth weight has favorable impacts on health throughout the life cycle.

Recent trends in infant mortality in the United States provide suggestive, although not definitive, evidence of the importance of

prenatal care. From 1964 to 1974, the infant mortality rate declined by 3.9 percent per year. This was an extremely rapid rate compared to the comparable figure of 0.6 percent per year from 1955 to 1964.[37] The latter period witnessed the introduction of Medicaid, maternal and infant care projects, and the neighborhood health center program. Rogers and Blendon associate the trend in infant mortality with these developments, although they are careful to emphasize that there is no evidence of a cause-and-effect relationship.[38] Fuchs is somewhat more cautious because the period in question also witnessed the legalization of abortions and the widespread adoption of oral contraceptive techniques.[39] Nevertheless, Fuchs does not deny the effectiveness of adequate medical care during pregnancy and delivery, especially for high-risk pregnancies.

B. Pediatric Care

Even such an enthusiastic supporter of national health insurance for children as Marmor realizes that pediatric care makes small contributions at best to favorable child outcomes.[40] To be sure, immunizations against rubella, measles, diptheria, tetanus, pertussis, polio, and the mumps are extremely efficacious. Sharp declines in the reported number of cases of each disease occurred in the years immediately following the general availability of an immunization against it.[41] But routine pediatric care has small and often statistically insignificant effects on the health of children and adolescents in a number of recent studies.

Edwards and Grossman study the prevalence of obesity, abnormal corrected distance vision, and anemia (reflected by low hematocrit

levels) among white adolescents who were members of Cycle III of the U.S. Health Examination Survey.[42] Youths who saw a doctor for a preventive check-up within the past year (approximately 60 percent of the sample) have one-half percentage point smaller probabilities of being obese or of having abnormal corrected distance vision than other youths, and a one-fifth percentage point higher probability of having anemia. None of these three differentials is statistically significant.

Kaplan, Lave, and Leinhardt measure medical care input by enrollment in a comprehensive health care clinic and measure health output by number of days absent from school in a sample of elementary school children from low-income families in Pittsburgh, Pennsylvania.[43] With race and sex of the child held constant, enrollment in the clinic has a small negative effect on number of days absent from school. Unfortunately, the authors could not control for parents' education, which has been shown to be an extremely important factor in child health outcomes.[44]

Hu measures medical care by the dollar value of Medicaid benefits and by the receipt of a regular check-up in a sample of first-grade children in a coal mining county in Pennsylvania, mainly from low-income families.[45] Medicaid benefits have a positive and statistically significant effect on hearing correction[46] but have no effect on vision correction. The receipt of a regular check-up has no impact on either health measure.

Kessner studies the prevalence of middle ear infection and hearing loss, vision defects, and anemia in a sample of black children

between the ages of six months and eleven years in Washington, D.C.[47] He focuses on the relationship between these three health problems and the usual source of pediatric care (physicians in private solo practice, prepaid group practice, hospital pediatric outpatient departments, hospital emergency rooms, and public clinics). Kessner finds that source of care has no effect on prevalence of the three health conditions with socioeconomic status held constant. Using more sophisticated statistical techniques, Dutton and Silber have reexamined Kessner's basic result.[48] They report higher than average illness probabilities in solo practice and lower than average probabilities in prepaid group practice and in the hospital outpatient departments. These differences are small, however, and are not always statistically significant. Dutton also indicates that the frequency of a preventive health check-up has no significant impact (at the 5 percent level) on the presence of anemia in the Kessner sample.[49]

Inman estimates child health production functions in which preventive pediatric visits and curative pediatric visits appear as separate inputs.[50] His data sample is the one analyzed by Kessner, and his health measures are absence of ear, nose, and throat infections and absence of ear infection. The two pediatric care inputs tend to have positive effects on health, but their regression coefficients are small and rarely statistically significant.

In a sense it is not surprising that pediatric care has little impact on children's health. Many of their health problems are either self-limiting, such as morbidity from acute conditions, or irreversible, such as congenital abnormalities of the neurological system.

But the studies reviewed above indicate that this lack of potency extends to health problems that are capable of being affected by pediatric care and by family decisions concerning diet and other forms of at-home health care, as modified by the advice of physicians.

C. Dental Care

Although appropriate pediatric care has little impact on children's physical health outcomes, appropriate dental care is extremely important in their dental (oral) health outcomes. This is illustrated strikingly by multivariate analyses of the number of decayed teeth and the periodontal index (a negative correlate of good oral health)[51] of white adolescents who were members of Cycle III of the U.S. Health Examination Survey by Edwards and Grossman.[52] They find that there are large significant impacts of the receipt of a preventive dental visit in the past year on both the periodontal index and the decay index. In particular, adolescents who did not have a preventive dental check-up within the past year (approximately 30 percent of the sample) have periodontal indices and decay scores that are each about 30 percent of a standard deviation worse than adolescents who received a check-up.

Edwards and Grossman also provide strong results pertaining to the efficacy of a publicly provided form of preventive dental care--water fluoridation. Youths exposed to fluoridated water have significantly better oral health than other youths at all conventional levels of confidence. The fluoridation differentials are smaller, however, than the corresponding preventive dental care differentials in oral health.

For example, the fluoridation coefficient in the periodontal index equation is one-third as large as the preventive dental care coefficient. In the decay equations, the ratio of the two coefficients equals two-thirds. Nevertheless, given that the per-child cost of fluoridation is also substantially below the cost of a preventive dental visit,[53] this still remains a cost-effective method of improving dental health. Moreover, in 1975 approximately 50 percent of the population of the U.S. resided in communities that had water supplies with less than optimal fluoride levels.[54]

Research by Newhouse and Friedlander questions the effectiveness of dental care in adult health outcomes.[55] Using adults in Cycle I of the U.S. Health Examination Survey, they report an insignificant positive effect of the number of dentists per capita in the county of residence on the periodontal index. They do not explicitly recognize, however, the common-sense proposition that an increase in a community's dental manpower will not improve oral health outcomes unless it encourages more utilization of dental services. In particular, Edwards and Grossman argue that the appropriate way to measure the impact of dentists on dental health is to estimate two multiple regressions: one that relates oral health to the receipt of preventive dental care and a second that relates the receipt of preventive dental care to the per capita number of dentists in the community.[56] They show that the impact of dentists on the periodontal index estimated in this manner is very different from the effect estimated by the Newhouse-Friedlander procedure. Despite the findings by Newhouse and Friedlander, there is a consensus that the receipt of appropriate dental care in childhood

and in adulthood contributes to better oral health at all stages in the life cycle.[57]

D. Preventive Physicians' Services for Adults

There is little evidence that annual physical check-ups and mass screening programs for adults lead to improvements in health. Spark and Phelps summarize a number of studies that contain evidence that screening and check-ups are economically wasteful and only occasionally detect conditions that are aided by early treatment.[58] These authors and others conclude that preventive physicians' services for adults can raise medical care costs without significantly raising the level of health.

To be sure, there are selected health problems for which preventive care may be efficacious. The best documented cases are for glaucoma, breast cancer, cervical cancer, hypertension, and syphillis. For such major illnesses, however, as angina and stomach cancer, the efficaciousness of a secondary prevention is uncertain.[59] Moreover, even when diagnosis and treatment are possible, there are problems associated with false positives, low prevalence rates, adverse side effects of, for example, frequent mamographies to detect breast cancer, and poor follow-up compliance.

The above conclusions are highlighted by a longitudinal study of members of the Kaiser-Permanente Health Plan by Collen and his associates.[60] In 1964 approximately 10,000 members of the plan between the ages of thirty-five and fifty-four were randomly assigned to two groups comparable in socioeconomic status. The study group was urged

to come in for frequent periodic physical exams, while the control group was not. By mid-1975, 41 percent of the control group had not received a check-up, while only 16 percent of the study group had not received a check-up. Yet between 1965 and 1975, the overall mortality experience of the two groups was very similar. By 1975, 6.9 percent of the study group and 7.1 percent of the control group had died, a difference which is not statistically significant. The control group did, however, have higher death rates from two illnesses that offer substantial potential for postponement or prevention: colorectal cancer and hypertension complications. But even these findings where efficacy of prevention is established cannot be interpreted as evidence in favor of the effectiveness of selective, as opposed to mass, screening. The cost of detecting one case of colorectal cancer is extremely high. Only fifty-five cases were detected by protoscopic exams administered to 47,207 patients in a Mayo Clinic study.[61/] The detection of one case of hypertension is relatively cheap and a standard course of treatment exists to reduce blood pressure to normal. Despite this, the hypertension mortality differential in the Collen sample is not statistically significant.

It is universally recognized that lowering blood pressure in cases of extreme hypertension reduces both mortality and other severe complications.[62/] There is also some evidence that reducing blood pressure in patients with moderately severe or with mild hypertension also reduces mortality and morbidity. The recognition of the role of hypertension in heart disease and stroke has contributed in part to the rapid reduction in deaths from these causes since 1968.[63/] For these

reasons, it is worth considering the case of hypertension screening in more detail.

The Veterans Administration Cooperative Study Group examined a group of 143 male hypertensive patients with diastolic blood pressures between 115 and 126 mm Hg randomly assigned to active or placebo treatment.[64] In the placebo group there were twenty-seven cases of severe complications, while there were only two in the treated group. Four sudden deaths occurred in the control group and none in the treated group. The Veterans Administration Study Group also studied 380 male hypertensives with diastolic blood pressures between 90 and 114 mm Hg.[65] Treatment was estimated to reduce morbidity from 55 percent to 18 percent over a five year period: terminating morbid events occurred in thirty-five patients in the control group and only nine patients in the treated group. There was no reduction in myocardial infarction or sudden death. This study was confined to a small group of men and had very strict criteria. Hence it is difficult to generalize these results to the population at large.

While hypertension is easy to detect and treatment is efficacious, in the sense that there is a known course of treatment, screening for hypertension seems to have limited value. Lauridsen and Gyntelberg report on a study of male employees in public and private companies in Copenhagen.[66] A sample of 5,249 males aged forty to fifty-nine was initially examined in 1970-71. Of these, 196 had previously undetected severe or moderately high hypertension. While some dropped out of the the program, 150 of these men were examined in an outpatient clinic, treated if judged necessary, and then referred to their own personal

physician for further treatment. A five year follow-up was undertaken on the 150 men. At follow-up their mortality was twice as high and their prevalence of major cardiovascular complications (non-fatal myocardial infarction and stroke) was three times as high as the expected rate for Danish middle-aged men. This relatively poor prognosis may be the result of inadequate compliance: only 31 percent of these 150 men were well controlled on antihypertensive medication at the time of follow-up. Other studies have also shown the low efficiency of public screening for hypertension.[67] Finnerty and his colleagues have reported that by screening in supermarkets they were able to reach 61 percent of an adult urban, largely stable population, but that despite all efforts only 30 percent of those identified as having high blood pressure were available for treatment.[68]

The failure of mass screening in a best possible case (high prevalence, easy detection, known course of treatment) seriously questions the effectiveness of preventive care for adults. Future research may shed light on the effectiveness of preventive care in areas where current evidence is insufficient or not conclusive.[69] Until such time, however, we believe that the burden of proof should fall on the advocates of effectiveness.

Proponents of health maintenance organizations, which provide preventive care at no charge to their members, cite the lower rates of hospitalization of HMO members compared to the general population as evidence in favor of the effectiveness of these delivery systems and of preventive care. On the other hand, Pauly argues convincingly that these lower hospitalization rates can arise from the differential

reimbursement schemes in HMOs compared to other delivery systems.[69] In particular, physicians in private practice are paid on a fee-for-service basis, while reimbursement in an HMO setting takes the form of capitation payments. Since an HMO's cost is increased when a patient is hospitalized while its revenue is not altered, it has an incentive not to hospitalize patients if possible. In light of this factor and the results of the Collen study, it is unlikely that the lower hospitalization rates of HMO enrollees implies that their health is better than that of other groups in the population.

To summarize, in this section we have argued that prenatal care and dental care are effective but pediatric care (other than immunizations) and preventive physicians' services for adults are not. Many government health policies are directed at blacks and other low-income children and adults. Therefore, it is useful to point out that in general there is a correspondence between health measures for which care is effective and health measures for which race and income differences are observed. Black babies weigh less at birth than white babies and are more likely to die within the first year of life. Similar conclusions emerge when babies from low-income families are compared to those from high-income families.[70] Data from the Center for Disease Control reveal higher prevalence rates of measles and rubella among black children than among white children and among children who reside in poverty areas than among children who do not.[71] Edwards and Grossman show that the oral health of children is better if they are from high-income families or if they are white.[72] Newhouse and Friedlander reach similar conclusions with respect to the oral health

of adults.[73] Edwards and Grossman report that the physical health of children is not related to race or parents' income, with parents' schooling and other factors held constant.[74] Mortality and morbidity rates of white adults are positively related to income in a number of studies, although black adults have higher mortality rates than whites.[75]

The above suggests that there are income and race-related differences in health to offset in some cases but not in others.[76] These differences could be offset by lowering the price of preventive care for the poor via national health insurance, but they could also be offset by income transfers and other policies. We consider the choices among alternative policy options in more detail in the next two sections.

III. Determinants of Utilization of Preventive Medical Care Services

In this section we discuss the determinants of utilization of preventive medical care services. The coverage of preventive care under national health insurance would presumably result in a lower price of care. Yet the effects of other variables on utilization as well as price are also discussed in this section to identify variables whose effects government policy might try to offset (race, income, and other socioeconomic and family characteristics). Another reason for considering other variables is to compare a program of price cuts under national health insurance with programs to alter other variables in the purview of public policy (income and health manpower). For these reasons and because there are few multivariate studies of prenatal care and preventive doctor care for adults, the section is organized around the effects of sets of determinants rather than on the determinants of the

four kinds of care. The sets of determinants are as follows: (1) income, race, and Medicaid; (2) money and time prices; and (3) socioeconomic and family characteristics represented by schooling and family size. Income, race, and Medicaid are treated together because proverty is more prevalent among blacks than among whites and because Medicaid is aimed at low-income groups.

A. Income, Race, and Medicaid

During the period from 1963 through 1976, data on the utilization of the medical care services considered in this paper contain two principal messages with regard to race and income differences in utilization. First, cross-sectional surveys in selected years reveal that whites and high-income families made more use of almost all these services. Second, trend data on utilization of the same service reveal that income and race differences declined over time. To a large extent, these declines can be traced to Medicaid which reduces the net or out-of-pocket price of medical care to zero from the point of view of the consumer.[77/] In the case of pediatric care, one of the declines has been substantial: income differences in the average number of physician visits by children disappeared in 1975.[78/] Nevertheless, income and race differences in most measures of utilization still are large.

Taffel reports that in 1969 72.4 percent of all white mothers but only 42.7 percent of all black mothers started prenatal care in the first trimester of pregnancy.[79/] In 1975 the comparable figures were 75.9 percent for whites and 55.8 percent for blacks. Hence the difference between the probability that a white mother would obtain

care within the first trimester and the probability that a black mother would do so fell by ten percentage points over a five-year period. But the 1975 differential of twenty percentage points is sizable. A similar differential emerges when high-income mothers are compared to low-income mothers. In 1972, 71.2 percent of pregnant women whose family income was $15,000 or over saw a doctor within the first trimester of pregnancy. The corresponding figure for women whose family income was under $5,000 was 47.2 percent.[80/]

In 1976, white children and children from nonpoverty areas were more likely to have been immunized against measles, rubella, polio, mumps, and DPT (diptheria, whooping cough, and tetanus) than black children and children from poverty areas.[81/] The percentage of all children between the ages of one and four immunized against polio declined from 88 percent in 1964 to 75 percent in 1975.[82] This trend and the variations in immunization rates by race and income have been responsible in part for the EPSDT program under Medicaid and for the proposed CHAP program.

We have already indicated that the income difference in physician visits by children vanished by 1975. Based on a multiple regression analysis of physician visits in the 1969 U.S. Health Interview Survey, Davis and Reynolds show that this result can be attributed almost entirely to Medicaid.[83/] In particular, children from families with an income of under $5,000 who were eligible for welfare made approximately one more visit in 1969 than children from families with an income of under $5,000 who were not eligible for welfare. Note that a substantial fraction of children from low-income families are not

elibible for Medicaid.[84] Therefore income differences in visits remain for these children compared to children from high-income families.[85] Moreover, visits rise with income in the 1975 data if the lowest income category is not considered.[86] Note finally that black-white differences in visits have not been eliminated. Black children made approximately one fewer visit than white children in 1975.[87]

Gross income or race differences in other dimensions of pediatric care utilization have not been altered as much by Medicaid as the per capita number of visits. In 1973, 18.7 percent of poor children below the age of seventeen but only 11.9 percent of nonpoor children had not seen a physician in the past two years.[88] The race difference is almost identical to the income difference: 19 percent of black children and 12 percent of white children had not seen a doctor within the past two years.[89] With respect to routine physical exams, in 1973 8.9 percent of white children under the age of seventeen, 14.8 percent of nonwhite children, 20.3 percent of children from families with an income under $3,000, and 44 percent of children from families with an income of $15,000 or more received exams.[90]

Among children with at least one physician contact in a given year, white children and nonpoverty children are more likely to see private-practice physicians in their offices. Black children and poverty children are more likely to see physicians in hospital outpatient departments and public clinics not associated with hospitals.[91] Among children with positive visits to physicians in private practice in a given year, parents' income is positively related to the number of visits. Colle and Grossman estimate an income elasticity of visits of

.4 in 1970,[92] a figure that is much larger than the income elasticity of visits for adults.[93] In addition, in a sample of users of physicians in private practice, parents' income is positively related to the probability that the usual source of care is a board certified or nonboard certified pediatrician as opposed to a general practitioner.[94] In addition, in such a sample black children and Medicaid recipients are more likely to see general practitioners and the latter group makes fewer visits than non-Medicaid recipients.[95] The last two findings indicate that families on the Medicaid rolls encounter substantial barriers when they try to take their children to specialists or to make a relatively large number of visits to physicians in private practice. In particular, the findings reflect the reluctance of some physicians in private practice to accept Medicaid recipients as their patients because of uncertainties and rigidities associated with Medicaid reimbursement schedules, some of which fail to recognize physician specialties.[96]

Interactions and relationships among parents' income, race, and Medicaid in pediatric care utilization are highlighted in a study by Colle and Grossman with the 1970 CHAS-NORC health survey.[97] They perform a multivariate analysis of the probability that a child between the ages of one and five had a preventive physical examination, i.e. an examination for reasons other than illness or because it was required, in 1970. For whites the observed probability is 34.6 percent and for blacks it is 28.7 percent. This 6.0 percentage point gross difference is reduced to 1.9 percentage points when a number of variables are held constant. The latter differential is not statistically significant.

Put differently, differences in characteristics other than race between black and white families fully explain the preventive care differential. Black children would have the same probability of receiving an examination as whites if they had the same mean values of these characteristics.

In the multiple regression analysis, the probability of having an exam rises with income and is higher for welfare recipients than for non-welfare recipients. Of course, blacks have lower income than whites, but they are more likely to be on welfare. Colle and Grossman show that black children would have a 2.7 percentage point higher probability of having a preventive exam if they had the same mean family income as whites. On the other hand, blacks would have a 2.4 percentage point lower probability of having an exam if the proportion of blacks on welfare equaled the proportion of whites. Put differently, the welfare program, of which Medicaid is an integral part, is an effective policy tool for eliminating income-related differences in the utilization of preventive care. Blacks and whites would have the same observed probabilities if all their characteristics except for income and welfare eligibility were the same.[98/]

Dental care is an optional service under Medicaid. Therefore, income and race differences in dental care utilization by children and adults have not declined over time by nearly as much as the corresponding differences in pediatric care utilization. Wilson and White report substantial differences both for children and for adults in 1973.[99/] For example, data for that year indicate that 58.3 percent of poor children under the age of seventeen had not seen a

dentist in the past two years. The corresponding figure for nonpoor children was 37.2 percent. The differential probability of use fell between 1964 and 1973, but the difference in the mean number of dental visits by the two groups of children remained constant. A similar picture emerges when the utilization of poor and nonpoor adults are examined except that there was a slight reduction in the gap between the mean number of visits by the two groups.

In a multivariate context Edwards and Grossman find that family income has a positive and statistically significant effect on the probability that a white youth obtained a preventive dental check-up in the past year in Cycle III of the U.S. Health Examination Survey.[100/] The computed income elasticity of this probability equals .15. Manning and Phelps estimate a somewhat higher income elasticity of .51 for white children of all ages in the NORC survey.[101/] They also report income elasticities of .64 for white adult females and .73 for white adult males. Manning and Phelps also compute income elasticities of demand for dental visits by the three groups of whites. These equal .55 for adult females, .61 for adult males, and .87 for children.

With regard to the use of preventive physician services by adults, the U.S. Health Interview Survey for 1975 shows a mild positive correlation between number of physician visits per person for general check-ups and family income up to $15,000 (rising from .37 to .39 visits) and a strong positive correlation at higher levels of income (.49 visits for incomes between $15,000 and $25,000 and .55 visits for incomes in excess of $25,000).[102/] Preventive care as measured by general check-ups increases also relative to other forms of care: they constitute

less than 5 percent of all visits when family income is less than $3,000 and approximately 10 percent when family income is at least $15,000.

Gross comparisons over time reveal that the percentage of persons with family incomes less than $5,000 who had a general check-up during the year rose from 28 percent in 1971 to 37 percent in 1975, with little change in the fraction of the population with general check-ups in income brackets above $5,000.[103/] This remarkable increase in utilization at the lower end of the income distribution occurred during the time when Medicaid was expanded and may be tentatively interpreted as a direct result of the fall in cost, especially since over the period 1971 to 1975 aggregate real income did not change much.

The 1963 and 1970 NORC data reveal similar patterns.[104/] For both years the percentage of the population having never had a physical examination is negatively related to income and lower in 1970 than in 1963. Moreover, the interval of time between check-ups is shorter the higher is family income, and the mean intervals by income class seem to be more similar in 1970 than in 1963. The proportion of the population having never had a physical exam is higher for nonwhites than it is for whites, but the frequency of exams within a year is about the same for both races.

The NORC data distinguish between physical examinations elicited by the occurrence of self-assessed symptoms; those that are required for a job, school, insurance, armed forces, or similar circumstances; and those that are preventive.[105/] Preventive exams are positively related to income in both 1963 and 1970. This positive income effect on prevention is consistent with the evidence from the U.S. Health

Interview Survey reported above. By contrast, the fraction of exams that are required is highest for the middle income groups, and the fraction of visits elicited by symptoms falls with family income. These patterns are consistent with the higher prevalence rates of disease at the lower end of the income distribution.[106/]

The fraction of physical exams that are preventive rose from 29 percent in 1963 to 37 percent in 1970. The fraction of such exams was lower for nonwhites than for whites in 1963, although by 1970 the difference was eliminated.

More detail on preventive care is available from the 1973 U.S. Health Interview Survey. It gives information on the utilization of selected preventive services by specific population groups. These services include electrocardiograms, chest X-rays, glaucoma tests, eye examinations, pap smears, and breast examinations. In general, high-income persons were more likely to have received these services than low-income persons.[107/] These patterns are, however, not always clear-cut. While for chest X-rays, glaucoma tests, pap smears and breast examinations, the fraction of persons ever having had an exam rises monotonically with income, for electrocardiograms this fraction rises only when family income exceeds $15,000.

Moreover, intervals since last visits for these specific tests are shorter uniformly by income group only for pap smears and breast exams. For electrocardiograms and chest X-rays, intervals are shortest at the low and the high end of the income distribution, and for glaucoma tests intervals shorten only when family income reaches $15,000.

Whites are more likely to have had any one of these tests than blacks, except for chest X-rays where the likelihoods are the same. For all tests, however, except glaucoma, the percentage having had a test in less than a year is higher for nonwhites than it is for whites.

Our survey of the impacts of income and Medicaid on utilization reveals that pediatric care and preventive physicians' services for adults are sensitive to these variables, although the effectiveness of pediatric care and check-ups is questionable. One explanation of these results is that people want to verify that they are healthy,[108/] and the demand for this information is sensitive to income and price (Medicaid). A second explanation is that, although preventive care may not be effective for the average individual, it may have impacts on certain individuals. Such differential impact effects are probably subject to a considerable amount of uncertainty.

B. Money and Time Prices

The coverage of preventive care under national health insurance would lower the net or out-of-pocket price of care from the point of view of the consumer. Therefore, estimates of the price elasticity of demand for care play a central role in predictions about the effects of NHI on the utilization of these services. Price effects were treated to some extent in our discussion of Medicaid in the previous subsection. In the present subsection our focus is on price variations associated with private health insurance and other factors.

It should be realized that, since the consumer's time is required to produce health and obtain medical care, the relevant price

in the demand function for care contains a money price component and a time price component. In the case of a visit to a physician or a dentist, the money price pertains to the direct payment to the provider net of insurance payments. The time price pertains to the sum of the time spent traveling to reach the provider and return home and waiting to see him at the source of care multiplied by the opportunity cost of time.[109/] For pediatric care or dental care for children, since the mother typically is responsible for the child, the opportunity cost of time is evaluated by her actual or potential hourly wage rate in studies by Inman; Colle and Grossman; and Goldman and Grossman.[110/] The existence of a time price component implies that the money price elasticity of demand for care should fall in absolute value as income rises. This is because the value of time rises with income. Therefore, a 1 percent reduction in money price is associated with a smaller percentage reduction in total price for the rich.[111/] The possibility of differential price elasticities by income is relevant if price cuts under national health insurance are directed at low-income families and if coverage of time costs is excluded. Empirical evidence with respect to income-related differences in price elasticities and with respect to the effects of both money price and time price are reviewed below.

To our knowledge there are no studies of the effects of money or time price on the receipt of prenatal care. Information on the effects of these variables on the receipt of preventive doctor care by adults also is very limited. Luft reports that the greater use of preventive services by HMO enrollees is due to their better financial coverage

rather than to incentives of HMOs to supply such services.[112/] In particular, he finds that differences in the use of preventive services disappear when HMO enrollees are compared to non-enrollees with private health insurance that covers preventive care or with Medicaid.

Estimates of money price elasticities of demand for physician visits by children in studies by Inman; Colle and Grossman; and Goldman and Grossman are presented in Table 2.[113/] The elasticities are fairly similar; they range in absolute value from .06 to .11. None of the studies explicitly investigates whether there are income-related differences in the price elasticity. Yet the results in the table shed some light on this issue because the mean level of family income varies among the samples analyzed. There is no evidence that the price elasticity falls in absolute value as income rises; if anything the reverse is true. The table also contains the finding that in each study the income elasticity exceeds the price elasticity by a substantial amount. This suggests that it might be more efficient to increase physician visits by means of income transfers to low-income families rather than by means of national health insurance.

Another aspect of the impact of money price on pediatric care services involves its effect on the choice of a specialist or a general practitioner as the usual source of care. Colle and Grossman and Goldman and Grossman find that parents who face lower money prices are more likely to select board certified pediatricians. This can be explained by the presence of the time price component in the total price of care. Consider two families one of which has health insurance for doctor visits with a 25 percent coinsurance rate. If time prices do

Table 2

ESTIMATES OF INCOME AND PRICE ELASTICITIES OF PEDIATRIC VISITS

	Study		
	Colle and Grossman (1978)	Goldman and Grossman (1978)	Inman[a] (1976)
Average income in sample	$10,000	$6,500	$8,700
Estimate of income elasticity	0.38	1.32	0.23
Estimate of price elasticity	-0.11	-0.06	-0.09
Sample and year	NORC 1970	Bronx, New York Residents 1965-66	Kessner 1970

[a] Inman fits separate functions for preventive and curative visits. His estimates of income and price elasticities of each service are very similar. We show simple averages in the table.

not vary by source of care, the health insurance policy will lower the total price of a visit to a pediatrician relative to a general practitioner because pediatricians charge higher fees than general practitioners. Hence a national health insurance plan that either pays a fixed percentage of the fee of a visit or reduces money price to zero would increase the demand for specialists relative to general practitioners. This might be desirable if visits to pediatricians contributed to favorable child health outcomes. As we pointed out in Section II, however, there is no evidence in support of this proposition.

Both Inman and Goldman and Grossman report that the number of visits falls as the time cost of a visit rises. The elasticities are -.15 in the Inman study[114/] and -.12 in the Goldman-Grossman study. Colle and Grossman do not find evidence of a negative time cost coefficient in their demand curve for visits. They do indicate, however, that the time cost of a visit has a negative and statistically significant effect on the probability that a child obtained a preventive physical examination within the past year. A one dollar per visit increase in the time cost of a visit lowers the probability of obtaining preventive care by 1.2 percentage points. Colle and Grossman also report that children are more likely to have seen a physician within the past year and have more visits if the mode of transportation to the usual source of care is walking. This variable serves as a negative correlate of direct transportation costs. In summary, all three studies show that time and transportation costs are significant rationing mechanisms in the pediatric care market.

Consequently, even some Medicaid families may act as if the price of care is substantial.

Manning and Phelps provide price elasticities of demand for dental care for white children, white adult males, and white adult females.[115] Price elasticities of the probability of a dental check-up in the past year are -.59 for children, -.03 for adult males, and -.56 for adult females. Price elasticities of the number of dental visits are -1.40 for children, -.65 for adult males, and -.78 for adult females. Manning and Phelps allow for an interaction between income and price in their demand functions and obtain the result that price elasticities increase in absolute value rather than decrease as income rises.[116] They also show that the demand for dental visits would be dramatically altered if dental care were covered under national health insurance. "Demand appears roughly to double for adults and triple for children, when they pay nothing for dental care, rather than the full price."[117]

Holtmann and Olsen study the effects of waiting time and travel time on the number of dental visits per family who resided in New York and Pennsylvania in the period 1971-1972.[118] Waiting time has a negative effect on the number of visits, but travel time has a positive effect. Their results should be interpreted with caution because they aggregate visits by children and adults in the same family. On the other hand, Manning and Phelps report significant differences between the coefficients of demand functions for care by adults and demand functions for care by children.[119] Additional evidence on the role of time costs in the demand for dental care is contained in a study by

Edwards and Grossman.[120] They find that the probability that a youth had a preventive dental check-up within the past year is smaller if his mother works full-time in the labor market. Presumably, such mothers place a bigger value on their time than mothers who do not work.

Time prices are difficult to estimate. It is not surprising that their effects are so variable across studies. Another way of looking at time prices is to estimate their effect indirectly, namely through the effects of health manpower availability on utilization.

Recently-enacted Federal legislation has attempted to increase the availability of physicians and dentists in medically underserved areas to expand the use of preventive care in such areas. The Emergency Health Personnel Act of 1970 (PL 91-623) created the National Health Service Corps., whose members are assigned to health manpower shortage areas. The Health Professions Assistance Act of 1976 (PL 94-484) encourages new graduates of medical and dental schools to locate in urban ghettos and rural regions by forgiving their medical education loan obligations. Further, the Health Maintenance Organization Act of 1974 (PL 93-222) gives priority for developmental funding of HMSs in medically deprived areas.

In general research on the determinants of preventive care utilization shows that the receipt of care is sensitive to the availability of medical care inputs. Using data from the 1973 U.S. Health Interview Survey, Kleinman and Wilson show that the proportion of births to mothers who began prenatal care in the first trimester of pregnancy was lower in areas designated by the Secretary of Health, Education, and Welfare as medically underserved areas (MUAs) than in other areas.[121]

They also indicate that persons below the age of seventeen were more likely not to have had a routine physical examination during the past two years in MUAs. Finally, based on the indicators of preventive physicians' services for adults mentioned previously (chest X-rays, pap smears etcetera), adults in MUAs were less likely to receive preventive care.

In multivariate analyses, Colle and Grossman, Manning and Phelps, and Edwards and Grossman find that health manpower has large and statistically significant effects on the family's propensity to obtain preventive dental and doctor care for its children.[122/] For example, an increase of one dentist per thousand population in the county of residence increases the probability that youths visited the dentist for preventive care by approximately 17 percentage points both in Cycle III of the Health Examination Survey and in the NORC survey.[123/] It should be noted that these results are unlikely to reflect demand manipulation by physicians or dentists. The concept of demand manipulation refers to the ability of health personnel to shift the demand curve for their services, with all direct and indirect costs of these services held constant. In his extensive treatment of this phenomenon, Pauly shows that the demand manipulation effect should be larger in a sample of consumers with positive utilization than in a sample of all consumers. Moreover, his model gives no basis for expecting a demand manipulation effect in an equation that explains the probability of a check-up.[124/]

Based on the above considerations, it is appropriate to interpret the role of physicians or dentists in the preventive care demand

function as a reflection of information, entry, travel, waiting, and direct costs in the parents' decision to obtain care for their offspring. In the study by Edwards and Grossman, all factors are at work because they have no measure of the money price of dental care or pediatric care and only a crude proxy for time price. Manning and Phelps control for money price but not for time price. Colle and Grossman control for both prices so that their findings indicate the importance of information, inconvenience, and other kinds of entry costs.

As a prelude to our analysis of optimal health insurance in Section IV, it is useful to review Edwards and Grossman's estimates of the impacts of three government programs to improve the oral health of youths.[125/] First, they consider a $1,000 income-transfer to low-income families. This transfer would lower the periodontal index of youths from these families by .01 points and would lower their decay index by .02 points. (Such a program would also have other beneficial effects on children and their families.) These estimates take account of the direct favorable impact of income on oral health with preventive dental care held constant, and they also take account of the indirect favorable impact of income. In particular, an increase in income increases preventive dental care which increases oral health.[126/]

Next Edwards and Grossman consider a program to reduce or eliminate regional differences in the number of dentists per thousand population. Dentists are more numerous in urban areas than in rural areas. To take two sites in the Health Examination Survey, there were 1.1

dentists per thousand population in San Francisco, California, while there were .2 dentists per thousand population in San Benito, Texas in 1968. Suppose that this difference were eliminated by raising the numer of dentists in San Benito by one per thousand population. Then the periodontal index of youths in San Benito would fall by .04 points, and their decay index would fall by .05 points. Here the mechanism is an indirect effect alone; the number of dentists per capita is positively related to the receipt of a preventive dental exam, and the latter improves oral health. Finally, they consider an 80 percent reduction in the price of a dental check-up due to the enactment of a national health insurance plan for dental care with a 20 percent co-insurance rate. Based on research by Manning and Phelps on the impact of price on the propensity to obtain preventive dental care for children and youths, Edwards and Grossman estimate that such a policy would raise the probability of obtaining care by 16 percentage points.[127/] This would improve both the periodontal and the decay scores by .04 points.

Edwards and Grossman view their computations as illustrative rather than definitive. To choose among the three programs, information on the cost of each program and on the number of youths affected clearly is required. Moreover, Edwards and Grossman indicate that definitive computations of impact effects should take account of the supply elasticity of dental care and the exact nature of the relationship between dental manpower and the indirect costs (costs other than money price) of obtaining dental care. We would add one further point. A health manpower program differs much more in form

than in substance from a program to cover preventive care under national health insurance. After all, both programs seek to reduce the total price of preventive care. NHI cuts the money price component of care, while manpower programs cut both the money price and the indirect price components. If indirect costs are an important determinant of utilization, as our review indicates, NHI will be much more successful if policy makers recognize these costs and try to deal with them than if they ignore them. Put differently, health manpower programs and programs to develop delivery systems that lower indirect costs should not be ignored when NHI policies are being formulated.

C. Schooling and Family Size

With race, income, and price held constant, parents' schooling and family size are extremely important determinants of the receipt of preventive care. After controlling for husband's education (a proxy for income) Lewit finds that more educated women are more likely to see a physician within the first trimester of pregnancy and to make a greater number of prenatal visits than less educated women.[128/] Similarly, pregnant women with few living children receive more prenatal care than those with many living children. Colle and Grossman report that mother's schooling is a positive correlate of the probabilities that a child had a physician contact and a physical examination within the past year.[129/] The number of children in the family is a negative correlate of these two probabilities. Edwards and Grossman indicate similar effects of mother's schooling and family size on the probability that a youth received a preventive dental examination with the past

year.[130] More educated adults have higher probabilities of receiving preventive care services such as chest X-rays and pap smears.[131]

The importance of mother's schooling and family size in preventive care utilization are underscored by Colle and Grossman's analysis of differences between black and white children in the probability of an ambulatory contact and the probability of a preventive physical examination within the past year.[132] They show that the welfare program, including Medicaid, almost completely eliminates income-related differences in these two indexes of pediatric care between black and white children. Black-white differences in these measures persist primarily because black mothers have less education than white mothers and because black mothers have more children than white mothers. One can speculate that income-related differences in these measures and others persist over time for similar reasons. In particular, high-income mothers have more education and fewer children than low income mothers. Although researchers have not examined the latter issue explicitly, Edwards and Grossman show that income-related differences in several measures of the health of white children are due primarily to differences in mother's schooling and to a lesser extent family size.[133]

The implications of these findings are at the same time both disheartening and heartening. They are disheartening because they imply that policies to reduce differences in utilization via NHI and policies to reduce differences in health via income transfers and NHI may not succeed. This is because the key differences are in schooling and family size. These are extremely costly to reduce and will not be

altered, at least in the short run, by NHI and income transfers.[134] At the same time, the findings are heartening because black-white differences in schooling have narrowed over time, particularly since 1970. In 1960, the difference between the median school years completed by white females and the median school years completed by black females stood at 2.6 years. This difference declined to 2.0 years in 1970 and to 1.0 years in 1977.[135] Recall that the infant mortality rate, which historically has been higher for blacks than for whites, declined rapidly from 1964 to 1974. Is there a hint in these trends that a future policy of laissez faire may be the best one?

IV. Implications for Optimal National Health Insurance

In this concluding section we consider the implications of our analysis with respect to whether preventive care should be covered under NHI and with respect to the nature of the optimal plan. To be sure, we have already considered some of the implications of our discussions of the effects and determinants of preventive care in Sections II and III. Our purpose here is to pull together these empirical implications and others after first considering theoretical justifications for government subsidization of preventive care. Note that our intention is neither to design an optimal plan nor to estimate the costs of alternative plans. Rather our intention is to underscore relevant factors that should be kept in mind when decisions are made with respect to preventive care under NHI. Put differently, we do not have all the answers, but we want to raise some relevant questions.

The main justification for government interference with the preventive medical care decisions of its citizens is the existence of externalities. Two basic types of health-related externalities have been identified. Production externalities refer to situations in which the health of some individuals depends on the health or preventive medical care utilization of others. Consumption externalities refer to situations in which the utility, rather than the health, of some individuals depends on the health or preventive medical care consumption of others.[136/] In either situation it is easy to show that free rider problems will lead at least some individuals to choose levels of health or preventive medical care that are less than optimal from society's point of view. When there is a one-to-one correspondence between health and preventive medical care, it makes little difference whether the externality is specified in terms of health or in terms of care. This is likely to be true for immunizations against infectious diseases. But in the more common case there is a multivariate health production function, where medical care can substitute for other inputs. Here it makes a difference whether a consumption externality is specified in terms of health or in terms of the input of preventive medical care. It also makes a difference whether a production externality is specified in terms of preventive medical care or in terms of all preventive activities including preventive nonmedical activities such as careful driving. We discuss some implications of this distinction below.

The other justification for government attempts to modify the preventive care decisions of its citizens that we wish to consider

is the existence of moral hazard. We refer to situations in which an individual pays a fixed premium for the purchase of a health insurance policy that covers remedial (curative) medical care services associated with illness or accidents. That is, the premium does not reflect the individual's probability of becoming ill, a probability that is negatively related to preventive care. Pauly shows that moral hazard results in overinsurance of remedial care and too little preventive care.[137/] Put differently, it results in a substitution toward remedial care and away from preventive care.[138/] Clearly, there is a close correspondence between a theoretical argument to cover preventive care under NHI to combat moral hazard and a practical argument to cover preventive care in order to contain the cost of NHI.[139/]

Armed with the above justifications for government intervention in the preventive care market and with our detailed treatment of the extent of third-party coverage of care and the effects and determinants of care, we offer the following theoretical and empirical implications with respect to preventive care and NHI.

(1) When production and consumption externalities are specified in terms of preventive medical care, the optimal way to deal with these externalities is to subsidize the full (money and indirect) price of care. This provides a justification for the coverage of preventive care under NHI to lower the money price. But as demonstrated by Pauly, the optimal price cut should not be the same for everyone. In particular, since the private demand for preventive care rises with income, the optimal price reduction should fall with income. Beyond some income, no price reduction is required. Moreover, the optimal insurance

plan does not and should not eliminate income-related differences in utilization. Instead, it should reduce such differences.

(2) We note that the size of the optimal price dut depends on the price elasticity of demand for care at each income level. For example, if more refined estimates suggest that the price elasticity of demand for care is greater the lower is the level of income, a relatively small price cut would achieve substantial effects. It follows that the optimal price cut need not be monotonically related to income, if price elasticities of demand for care fall sufficiently rapidly as income increases.[140/] This points to the need to obtain precise estimates of response to price changes in order to formulate an actual price structure that is any way near optimal.

(3) The indirect costs of travel, waiting, entry, and information are important determinants of utilization. From an administrative point of view, these costs probably would be difficult to measure and allocate under NHI. For this reason health manpower programs and programs to develop delivery systems that lower indirect costs should not be ignored when NHI policies are being formulated.

(4) When production and consumption externalities are specified in terms of health and the health production function has a multivariate form, the optimal policy involves reductions in the prices of all inputs that contribute to favorable health outcomes. Since practical difficulties might preclude this approach, an income transfer program, possibly accompanied by reductions in the prices of easily-identified inputs, especially inputs whose shares in health costs are

large, might represent a second-best solution.[141] This is why income transfers should not be ignored when NHI is being considered. Both can be viewed as alternative, although not necessarily competing, means to accomplish the same goal. Regardless of the nature of the optimal program, if the private demand for health rises with income,[142] the optimal transfer or price reductions should fall with income. Income-related differences in health or differences due to factors correlated with income such as race or schooling are reduced but not eliminated by the optimal plan.[143]

(5) The application of a common coinsurance rate (possibly zero) to preventive medical care and curative medical care under NHI might or might not reduce moral hazard. The price of the former relative to the latter is unaffected by NHI only if the time price components and the gross money prices of each are the same or if the ratio of time price to total price is the same for each type of care. This is unlikely because the money price of curative care in the event of serious illness undoubtedly exceeds the money price of preventive care, while the time price of the former is smaller than that of the latter. Even if the relative price ratio is not affected, undesirable substitutions away from other goods including preventive nonmedical care and toward curative care might occur.[144]

(6) Prenatal care and dental care are effective, but pediatric care (except for immunizations) and preventive doctor care for adults are not. Moreover, health outcomes in which care is effective correspond to outcomes in which income-differences in health are observed. These empirical results and the theory of health as a consumption item

suggest that the optimal NHI plan should be characterized by benefits that fall as income rises. In addition, the plan should be selective rather than general with respect to the types of services covered. For instance, instead of providing complete coverage for preventive physicians' services to persons of all ages under NHI, the government should direct its attention at prenatal care and physicians' services during the first year of life.[145/] Similarly, the effectiveness of dental care throughout the life cycle suggests that the payoffs to the coverage of dental care from the age it is first received until age eighteen or beyond are substantial.[146/] It should be kept in mind, however, that a cost-effective alternative to preventive dental care exists in the form of water fluoridation and that half of the population of the U.S. resides in communities with less than optimal fluoride levels. So perhaps the optimal policy might be to attach significant coinsurance rates to dental care under NHI and simultaneously to encourage communities to adjust the fluoride content of their water supply systems.

(7) We do not know the income levels at which benefits for prenatal and dental services should end. We do know that there is little theoretical justification for the provision of benefits to persons from all income levels. Moreover, trends in the private health insurance market indicate that benefits might cease at a fairly moderate income level. We refer to the rapid increases in the percentages of the population with obstetrical care and dental care insurance in the recent past. The reductions in net price associated with these increases in coverage imply that the private demand of many families for effective services may be substantial.[147/]

(8) Any discussion of preventive NHI cannot ignore that a network of public programs already exists to finance and deliver preventive services to the poverty population. This network, which consists of Medicaid, the maternal and child health program, and the neighborhood health center program, constitutes a preventive NHI system for many poor persons. Despite valid criticisms, this system has made at least some improvements in the health of the poor. We can see no reason to scrap it. Rather what is called for is a more uniform set of eligibility standards and some modifications in the ways in which services are delivered and providers are reimbursed. In particular, less fragmentation of the health care delivery system would be desirable. Indeed it has been shown that this fragmentation is a major source of delay and noncompliance to treatment of recognized illness as well as for follow-ups to early detection.[148/]

(9) We will not discuss Medicaid reform in any detail because that topic is the subject of another paper in this volume. We will comment, however, on two aspects of the proposed reforms. First, our lack of enthusiasm for coverage of preventive physicians' services delivered to persons beyond the age of one under NHI does not imply that we think that existing Medicaid coverage of these services should be cutback. Instead, we are not enthusiastic about future expansions in this area. Second, some persons view the declining trend in the percentage of children immunized against polio with alarm. They use this trend as evidence in favor of the CHAP expansion of the EPSDT program under Medicaid. Yet the trend may simply reflect a reduction in the benefits associated with immunization in a period during which the

incidence of polio has been practically eliminated. Similar comments apply to arguments marshalled in support of CHAP based on income-related differences in rates of immunization against other infectious diseases. In the present-day U.S., externalities associated with these diseases are of little importance. To the extent that higher-income parents "demand" a lower probability that their children contact these diseases, income-related differences should persist in equilibrium. This is not to say that the present differentials are the optimal ones dictated by a merit-externality model. But we would like to suggest that, in a climate of "tight" Federal and state budgets, the prenatal care initiatives in CHAP should be given a much higher priority than the other parts of the program.

(10) Even in cases in which preventive care is effective, the provision of more care to blacks or low-income persons will not and should not eliminate differences in health. Moreover, income transfers will not eliminate these differences because health varies among individuals with income and preventive care held constant. In particular, the studies that we have reviewed point to mother's schooling as a key "preventive nonmedical determinant" of infant health and oral health outcomes. Race and income-related differences in mother's schooling are extremely costly to offset. Further, mother's schooling and preventive care may be complements. It is known that more educated mothers make more use of prenatal care and dental care; and it is plausible that the impact of care on certain health outcomes rises as schooling rises.[149/] Another example of complementarity may be compliance with the treatment prescribed as a result of a screening

examination. For instance, in the case of hypertension, more educated consumers may be more likely to modify their diets and take the appropriate medication. Lest the reader be disheartened he should recall the dramatic decline in the difference between black female and white female schooling levels since 1970. This decline may narrow race and income-related differences in health in the future and curtail the amount of preventive medical care that the government should finance on the grounds of consumption externalities.

(11) Finally it is worth repeating that our arguments in favor of national health insurance rest on externalities. Yet there is a market for private contributions for medical care, through several nonprofit institutions. It is an open question to what extent production and consumption externalities are already internalized through private giving and voluntary transfers.

Our answers to the three questions posed by this conference are as follows:

> Preventive NHI: What Now? Medicaid reform with an emphasis on prenatal care, mandatory dental coverage for Medicaid children
>
> Preventive NHI: What Later? A preventive NHI program for moderate-income families with an emphasis on prenatal care and dental care, mandatory dental coverage for Medicaid adults
>
> Preventive NHI: What Never? Complete coverage of all preventive medical care services for all groups in the population

These answers appear to be at variance with the widespread support for comprehensive and universal NHI expressed in the media and in public opinion polls. Are we simply "bucking" an inevitable trend? We think not. Although most people say they favor NHI, a recent survey by the

Health Insurance Institute shows that this percentage falls dramatically when it is pointed out that the enactment of NHI is likely to be accompanied by higher taxes.[150] Thus, when people are asked "to put their money where their mouths are," there is much less enthusiasm for comprehensive NHI.

FOOTNOTES

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1/ Saul Waldman, National Health Insurance Proposals: Provisions of Bills Introduced in the 93rd Congress as of February 1974, U.S. Department of Health, Education and Welfare, Social Security Administration, Office of Research and Statistics, 1974.

2/ U.S. Congress, Senate, Congressional Record, September 25, 1979; and New York Times, "Comparison of Health Proposals," June 14, 1979.

3/ See for example L. Breslow and B. Klein, "Health and Race in California," American Journal of Public Health, vol. 61 (April 1971); Victor R. Fuchs, "Some Economic Aspects of Mortality in Developed Countries," in The Economics of Health and Medical Care, edited by Mark Perlman (London: MacMillan, 1974); Victor R. Fuchs, Who Shall Live? Health, Economics and Social Choice (New York: Basic Books, Inc., 1974); Michael Grossman, "The Correlation Between Health and Schooling," in Household Production and Consumption, edited by Nestor E. Terleckyj (New York: Columbia University Press for the National Bureau of

Economic Research, 1975); Lawrence Manheim, "Health, Health Practices, and Socioeconomic Status: The Role of Education," Ph.D. dissertation, University of California at Berkeley, 1975; Linda N. Edwards and Michael Grossman, "Adolescent Health, Family Background, and Preventive Medical Care," in volume III of the Annual Series of Research in Human Capital and Development, edited by Ismail Sirageldin and David Salkever (Greenwich, Connecticut: JAI Press, forthcoming); and Linda N. Edwards and Michael Grossman, "Children's Health and the Family," in volume II of the Annual Series of Research in Health Economics, edited by Richard M. Scheffler (Greenwich, Connecticut: JAI Press, 1980).

4/ In Section IV of this paper, we consider the implications, for an optimal health insurance plan, of the possible existence of complementarities between preventive medical care and preventive nonmedical care.

5/ Eli H. Newberger, Carolyn Moore Newberger and Julius B. Richmond, "Child Health in America: Toward a Rational Public Policy, Milbank Memorial Fund Quarterly, vol. 54 (Summer 1976); Kenneth Keniston and the Carnegie Council on Children, All Our Children: The American Family Under Pressure (New York: Harcourt Brace Jovanovich, 1977); Theodore R. Marmor, "Children and National Health Insurance," in Developing a Better Health Care System for Children, volume III of the report of the Harvard Child Health Project Task Force (Cambridge, Mass.: Ballinger Publishing Company, 1977); and Theodore R. Marmor, "Rethinking National Health Insurance," The Public Interest (winter 1977).

6/ Our focus on children is due in part to Phelps's excellent recent paper on insurance of preventive care for adults. See Charles E. Phelps, "Illness Prevention and Medical Insurance," Journal of Human Resources, vol. 13, Supplement (1978).

7/ Isaac Ehrlich and Gary S. Becker, "Market Insurance, Self-Insurance and Self-Protection," Journal of Political Economy, vol. 80 (July/August 1972).

8/ For a similar discussion, see Mark V. Pauly, Medical Care at Public Expense: A Study in Applied Welfare Economics (New York: Praeger Publishers, 1971).

9/ The percentage of the population with X-ray and laboratory examination insurance exceeds the percentage with doctor office visits insurance in Table 1 because sometimes the former type of insurance is limited to X-rays and tests performed in a hospital.

10/ Marjorie Smith Carroll. "Private Health Insurance Plans in 1976: An Evaluation," Social Security Bulletin, vol. 41 (September 1978).

11/ For a detailed discussion of this point, see Phelps, "Illness Prevention."

12/ Ronald Andersen, Joanna Lion, and Odin W. Anderson, Two Decades of Health Services: Social Survey Trends in Use and Expenditure (Cambridge, Mass.: Ballinger Publishing Company, 1976).

13/ Harvard Child Health Project, Toward a Primary Medical Care System Responsive to Children's Needs, volume I of the report of the Harvard

Child Health Project Task Force (Cambridge, Mass.: Ballinger Publishing Company, 1977). This estimate agrees with the one reported by Colle and Grossman based on their research with children between the ages of one and five in the NORC survey. See Ann D. Colle and Michael Grossman, "Determinants of Pediatric Care Utilization," Journal of Human Resources, vol. 13, Supplement (1978).

14/ Andersen, Lion and Anderson, Two Decades.

15/ Andersen, Lion and Anderson, Two Decades.

16/ Prenatal care, pediatric care, preventive physicians' services for adults, and dental care all are eligible for the medical expense deduction under the Federal income tax. Due, however, to the sizable deductible that must be satisfied (3 percent of adjusted gross income), this cannot be an important source of "insurance" of preventive care for most taxpayers.

17/ Our discussion is based on Anne-Marie Foltz, "Uncertainties of Federal Child Health Policies: Impact in Two States," U.S. Department of Health, Education, and Welfare, Public Health Service, National Center for Health Services Research, 1978; Anne-Marie Foltz and Donna Brown, "State Response to Federal Policy: Children, EPSDT, and the Medicaid Muddle," Medical Care, vol. 13 (August 1975); Anne-Marie Foltz, "The Development of Ambiguous Federal Policy: Early and Periodic Screening, Diagnosis and Treatment (EPSDT)," Milbank Memorial Fund Quarterly, vol. 53 (Winter 1975); and Karen Davis and Cathy Schoen, Health and the War on Poverty (Washington, D.C.: The Brookings Institution, 1978).

18/ Robert M. Gibson and Charles R. Fisher, "National Health Expenditures, Fiscal Year 1977," Social Security Bulletin, vol. 41 (July 1978).

19/ We do not discuss persons covered under Medicaid because they are aged, blind, or disabled recipients of supplemental security income (SSI).

20/ Davis and Schoen, War on Poverty.

21/ Karen Davis and Roger Reynolds, "The Impact of Medicare and Medicaid on Access to Medical care," in The Role of Health Insurance in the Health Services Sector, edited by Richard Rosett (New York: Neale Watson Academic Publications, 1976); and Davis and Schoen, War on Poverty.

22/ Davis and Schoen, War on Poverty.

23/ For a detailed outline of the benefits provided in each state, see Health Care Financing Administration, Data on the Medicaid Program: Eligibility, Services, Expenditures: Fiscal Years 1966-78 (Washington, D.C.: The Institute for Medicaid Management, 1978).

24/ The effects of indirect costs on utilization are discussed in Section III of this paper.

25/ These data are from an unpublished memorandum kindly supplied to us by Malcolm Curtis, Human Resources Division, Congressional Budget Office. For a careful review of EPSPT see Edward F.X. Hughes and his associates, An Assessment of the Validity of the Results of HCFA's Demonstration and Evaluation Program for the Early and Periodic Screening, Diagnosis and Treatment Program: A Metaevaluation. Center for Health Services and Policy Research, Northwestern University.

26/ Note that this standard would make women pregnant with their first child eligible for Medicaid in all states.

27/ Currently, EPSDT covers the cost of a dental examination and treatment of problems uncovered by the examination. States have the option of covering or not covering routine dental care for children that is not associated with the EPSDT assessment.

28/ Davis and Schoen, War on Poverty.

29/ Gibson and Fisher, "National Health Expenditures."

30/ Eugene M. Lewit, "Experience with Pregnancy, the Demand for Prenatal Care, and the Production of Surviving Infants," Ph.D. dissertation, City University of New York Graduate School, 1977.

31/ Ronald L. Williams, "Outcome-Based Measurements of Medical Care Output: The Case of Maternal and Infant Health," Ph.D. dissertation, University of California at Santa Barbara, 1974.

32/ Williams, "Outcome-Based Measurements."

33/ Davis and Schoen, War on Poverty.

34/ Davis and Schoen, War on Poverty, p. 176.

35/ For example, Linda N. Edwards and Michael Grossman, "The Relationship between Children's Health and Intellectual Development," in Health: What is it Worth?, edited by Selma Mushkin and David Dunlop (Elmsford, N.Y.: Pergamon Press, Inc., 1979).

36/ Robert A. Shakotko, Linda N. Edwards and Michael Grossman, "The Dynamics of Health and Cognitive Development in Adolescence," paper

presented at the fifty-fourth annual conference of the Western Economic Association, Las Vegas, Nevada, June 1979.

37/ Victor R. Fuchs, "The Great Infant Mortality Mystery, or What Caused the Slump?," mimeograph, 1978.

38/ David E. Rogers and Robert J. Blendon, "Feeling Fine," The New York Times (June 27, 1977).

39/ Fuchs, "Infant Mortality Mystery"; and Fuchs, Who Shall Live? In research in progress, Jacobowitz and Grossman are studying the effects of Medicaid, M and I projects, the legalization of abortion, the use of oral contraceptive techniques, and other factors on variations in infant mortality rates among counties of the U.S. See Steven Jacobowitz and Michael Grossman, "Determinants of Variations in Infant Mortality Rates Among Counties of the United States," in progress.

40/ Marmor, "Children and National Health Insurance."

41/ National Center for Health Statistics and the National Center for Health Services Research, Health: United States, 1978, U.S. Department of Health, Education and Welfare, Public Health Service, 1978.

42/ Edwards and Grossman, "Adolescent Health."

43/ Robert S. Kaplan, Lester B. Lave, and Samuel Leinhardt, "The Efficacy of a Comprehensive Health Care Project: An Empirical Analysis," American Journal of Public Health, vol. 62 (July 1972).

44/ For example, Edwards and Grossman, "Adolescent Health"; Edwards and Grossman, "Children's Health and the Family"; and Shakotko, Edwards and Grossman, "Dynamics of Health."

45/ Teh-Wei Hu, "Effectiveness of Child Health and Welfare Programs: A Simultaneous Equations Approach," Socio-Economic Planning Sciences, vol. 7 (1973).

46/ A problem arises in interpreting Hu's result for hearing correction because of the way in which he coded this variable: zero if the child had normal hearing, one if the child had hearing defects corrected, and minus one if the child had uncorrected defects. This coding scheme gives children with a corrected defect more "health" according to this index of health than children with no defect.

47/ David M. Kessner. Assessment of Medical Care for Children (Washington, D.C.: Institute of Medicine, 1974).

48/ Diana B. Dutton and Ralph S. Silber, "Children's Health Outcomes in Six Different Ambulatory Care Delivery Systems," mimeograph, March 1979.

49/ Diana B. Dutton, "Hematocrit Levels and Race: An Argument Against the Adoption of Separate Standards in Screening for Anemia." Paper presented at the American Public Health Association Meetings in Los Angeles, October 18, 1978.

50/ Robert P. Inman, "The Family Provision of Children's Health: An Economic Analysis," in The Role of Health Insurance in the Health Services Sector, edited by Richard Rosett (New York: Neale Watson Academic Publications, 1976).

51/ Kelly and Sanchez describe the periodontal index as follows:

> Every tooth in the mouth ... is scored according to the presence or absence of manifest signs of periodontal disease. When a portion of the free gingiva is inflamed, a score of 1 is recorded. When completely circumscribed by inflammation, teeth are scored 2. Teeth with frank periodontal pockets are scored 6 when their masticatory function is unimpaired and 8 when it is impaired. The arithmetic average of all scores is the individual's [periodontal index] ...

See James E. Kelly and Marcus J. Sanchez, Periodontal Disease and Oral Hygiene Among Children, National Center for Health Statistics, U.S. Department of Health, Education and Welfare, Public Health Service, 1972, pp. 1-2.

52/ Edwards and Grossman, "Adolescent Health."

53/ "Fluoridation: The Cancer Scare," Consumer Reports, vol. 43 (July 1978).

54/ National Center for Health Statistics and the National Center for Health Services Research, Health: United States.

55/ Joseph P. Newhouse and Lindy J. Friedlander, The Relationship Between Medical Resources and Measures of Health: Some Additional Evidence (Santa Monica, Calif.: The Rand Corporation, May 1977).

56/ See Edwards and Grossman, "Adolescent Health." Technically, the Edwards-Grossman procedure is to estimate an oral health production function, a preventive dental care demand function, and the solved reduced form of the production and demand model. On the other hand, Newhouse and Friedlander use the estimated reduced form of such a model. The latter does not incorporate the restriction that

the number of dentists should not appear in the production function. In fairness to Newhouse and Friedlander, they are forced to fit the reduced form directly because they lack data on dental care utilization.

57/ National Center for Health Statistics and the National Center for Health Services Research, Health: United States.

58/ Richard Spark, "The Case Against Regular Physicals," The New York Times (July 25, 1976); and Phelps, "Illness Prevention."

59/ For example, Donald Louria et al., "Primary and Secondary Prevention among Adults: An Analysis with Comments on Screening and Health Education," Preventive Medicine, vol. 5 (1976).

60/ Morris F. Collen, editor, Multiphasic Health Testing Services (New York: John Wiley and Sons, 1978); and Loring G. Dales, Gary D. Friedman, and Morris F. Collen, "Evaluating Periodic Multiphasic Health Checkups: A Controlled Trial," Journal of Chronic Disease, vol. 32 (1979).

61/ Spark, "Regular Physicals."

62/ For example, M. Sokolow and D. Perloff, "Five-Year Survival of Consecutive Patients with Malignant Hypertension Treated with Antihypertensive Agents," American Journal of Cardiology, vol. 6 (November 1960); E.R. Mohler and E.D. Freis, "Five-Year Survival of Patients with Malignant Hypertension Treated with Antihypertensive Agents," American Heart Journal, vol. 60 (September 1960); and S.Bjork et al., "The Effect of Active Drug Treatment in Severe Hypertensive Disease," Acta Med Scand, vol. 169 (June 1961).

63/ Surgeon General of the United States, Healthy People: The Surgeon General's Report on Health Promotion and Disease Prevention, U.S. Department of Health, Education and Welfare, Public Health Service, 1979.

64/ Veterans Administration Cooperative Study Group on Antihypertensive Agents, "Effects of Treatment on Morbidity in Hypertension, I. Results in Patients with Diastolic Blood Pressures Averaging 115 Through 129 mm Hg," JAMA, vol. 202 (December 11, 1967).

65/ Veterans Administration Cooperative Study Group on Antihypertensive Agents, "Effects of Treatment on Morbidity on Hypertension, I. Results in Patients with Diastolic Blood Pressure Averaging 90 Through 114 mm Hg," JAMA, vol. 213 (August 17, 1970).

66/ Lone Lauridsen and Finn Gyntelberg, "A Clinical Follow-Up Five Years After Screening for Hypertension in Copenhagen, Males Aged 40-59," International Journal of Epidemiology, vol. 8 (March 1979).

67/ For example, Milton Weinstein and William Stason, Hypertension - A Policy Perspective (Cambridge, Mass.: Harvard University Press, 1976); M.F. D'Souza, A.V. Swan, and D.J. Shannon, "A Long-Term Controlled Trial of Screening for Hypertension in General Practice," Lancet (1976); W.E. Miall and S. Chinn, "Screening for Hypertension: Some Epidemiological Observations," British Medical Journal, vol. 3 (1974); and R. Stamler et al., "Adherence and Blood Pressure Response to Hypertension Treatment," Lancet (1975).

68/ F.A. Finnerty, Jr., L.W. Shaw and C.K. Himmelsbach, "Hypertension in the Inner City, Part 2: Detection and Follow-Up," Circulation, vol. 47 (1973).

69/ See Mark V. Pauly, "Efficiency, Incentives and Reimbursement for Health Care," Inquiry, vol. 7 (1970). For careful empirical evaluations of HMOs, see Harold S. Luft, "How Do Health Maintenance Organizations Achieve Their 'Savings': Rhetoric and Evidence," New England Journal of Medicine, vol. 298 (June 15, 1978); and Harold S. Luft, "Why Do HMOs Seem to Provide More Health Maintenance Services?" Milbank Memorial Fund Quarterly, vol. 56 (Spring 1978).

70/ For example, Brian MacMahon, Mary Grace Kovar and Jacob J. Feldman, Infant Mortality Rates: Socioeconomic Factors, U.S. Department of Health, Education and Welfare, Public Health Service and Mental Health Administration, 1972; Fuchs, "Mortality in Developed Countries"; Fuchs, Who Shall Live"; Steven L. Gortmaker, "Poverty, Race, and Infant Mortality in the United States," Institute for Research on Poverty Discussion Paper No. 404-77, University of Wisconsin, 1977; Lewit, "Experience with Pregnancy"; and Selma Taffel, Prenatal Care in the United States, 1969-1975, U.S. Department of Health, Education and Welfare, Public Health Service, 1978.

71/ Center for Disease Control, "United States Immunization Survey, 1976," U.S. Department of Health, Education and Welfare, Public Health Service, 1977.

72/ Edwards and Grossman, "Adolescent Health"; and Edwards and Grossman, "Children's Health and the Family."

73/ Newhouse and Friedlander, "Medical Resources and Measures of Health."

74/ Linda N. Edwards and Michael Grossman, "Income and Race Differences in Children's Health," National Bureau of Economic Research Working Paper No. 308, 1979; Edwards and Grossman, "Adolescent Health"; and Edwards and Grossman, "Children's Health and the Family."

75/ For example, Richard D. Auster, Irving Leveson and Deborah Sarachek, "The Production of Health: An Exploratory Study," Journal of Human Resources, vol. 4 (Fall 1969); Michael Grossman, The Demand for Health: A Theoretical and Empirical Investigation (New York: Columbia University for the National Bureau of Economic Research, 1972); Grossman, "Health and Schooling"; Fuchs, "Mortality in Developed Countries"; Fuchs, Who Shall Live". These studies control for reverse causality from poor health to low income in a variety of ways.

76/ In general, conclusions reached with respect to the existence or nonexistence of income and race differences are valid whether or not medical care is held constant. When care is efficacious, sensitive to income, and not held constant, the gross difference exceeds the net (medical care-constant) difference. This pertains to infant health and oral health. In the case of prevalence of infectious diseases, net differences have not been obtained.

77/ For example, Davis and Reynolds, "Access to Medical Care"; Colle and Grossman, "Pediatric Care"; and Davis and Schoen, War on Poverty.

78/ National Center for Health Statistics, Physician Visits: Volume and Interval Since Last Visit, 1975, U.S. Department of Health, Education and Welfare, Public Health Service, 1979.

79/ Taffel, Prenatal Care.

80/ National Center for Health Statistics, Use of Selected Medical Procedures Associated with Preventive Care, 1973, U.S. Department of Health, Education and Welfare, Public Health Service, 1977.

81/ Center for Disease Control, "United States Immunization Survey, 1975," U.S. Department of Health, Education and Welfare, Public Health Service, 1976.

82/ Center for Disease Control, "United States Immunization Survey, 1971," U.S. Department of Health Education and Welfare, Public Health Service, 1971; and Center for Disease Control, "Immunization Survey, 1975."

83/ Davis and Reynolds, "Access to Medical Care."

84/ As indicated in Section I, this figure was 45 percent in 1970.

85/ In 1975 children from families with an income of under $5,000 made exactly the same number of visits on average as children from families with an income of $15,000 or over. This means that children who received Medicaid benefits made more visits than their counterparts in the $15,000 or over family income class.

86/ National Center for Health Statistics, Physician Visits.

87/ National Center for Health Statistics, Physician Visits.

88/ Ronald W. Wilson and Elijah L. White, "Changes in Morbidity, Disability, and Utilization Differentials between the Poor and Nonpoor: Data from the Health Interview Survey: 1964 and 1973," Medical Care, vol. 15 (August 1977).

89/ Wilson and White present data that reveal a downward trend in these differentials between 1964 and 1973. See Wilson and White, "Changes in Morbidity."

90/ National Center for Health Statistics, Preventive Care.

91/ Colle and Grossman, "Pediatric Care"; and National Center for Health Statistics and the National Center for Health Services Research, Health: United States.

92/ Colle and Grossman, "Pediatric Care."

93/ For example, Charles E. Phelps, "Effects of Insurance on Demand for Medical Care," in Equity in Health Services, edited by Ronald Andersen, Joanna Kravits and Odin W. Anderson (Cambridge, Mass.: Ballinger Publishing Company, 1975).

94/ Colle and Grossman, "Pediatric Care"; and Fred Goldman and Michael Grossman, "The Demand for Pediatric Care: An Hedonic Approach," Journal of Political Economy, vol. 86 (April 1978).

95/ Colle and Grossman, "Pediatric Care."

96/ For example, Davis and Schoen, War on Poverty; and Frank Sloan, Janet Mitchell and Jerry Cromwell, "Physician Participation in State Medicaid Programs," Journal of Human Resources, vol. 13, Supplement (1978).

97/ Colle and Grossman, "Pediatric Care."

98/ The sources of the observed difference in the probability of receipt of preventive care are discussed in Section III-D. Colle and Grossman perform a similar analysis of the probability that a child

had at least one physician contact in 1970. They reach a similar conclusion: the income-related difference in the probability of use between blacks and whites are entirely offset by the welfare program.

99/ Wilson and White, "Changes in Morbidity."

100/ Edwards and Grossman, "Adolescent Health."

101/ Willard B. Manning Jr. and Charles E. Phelps, Dental Care Demand: Point Estimates and Implications for National Health Insurance (Santa Monica, Calif.: The Rand Corporation, 1978).

102 / National Center for Health Statistics, Physician Visits.

103/ National Center for Health Statistics, Physician Visits. These figures assume that persons will have only one general check-up within a year. Comparable figures cannot be obtained prior to 1971 because general check-ups were recorded under a more narrow definition starting in 1971.

104/ Andersen, Lion and Anderson, Two Decades.

105/ The NORC questionnaire specifies "there was nothing particularly wrong and the examination wasn't required--it was just time for a check-up or physical examination." The NCHS definition of general check-up is less inclusive than the NORC definition of physical examination because it excludes those check-ups occasioned by a specific condition. On the other hand it is more inclusive than the NORC definition of preventive physical examination because it includes those exams that are required.

106/ The above statement is not inconsistent with our proposition at the end of Section II that morbidity and mortality rates of white adults rise with income. The latter proposition refers to studies that control for schooling and also for reverse causality from poor health to low income.

107/ National Center for Health Statistics, Preventive Care.

108/ For example, Phelps, "Illness Prevention."

109/ If the trip to the source of care is made by a mode of transportation other than walking, the direct cost of the trip would be included in the total price of a visit.

110/ Inman, "Family Provision of Children's Health"; Colle and Grossman, "Pediatric Care"; and Goldman and Grossman, "Demand for Pediatric Care."

111/ For a rigorous derivation of the above proposition and some exceptions to it, see Michael Grossman and Elizabeth H. Rand, "Consumer Incentives for Health Services in Chronic Illness," in Consumer Incentives for Health Care, edited by Selma J. Mushkin (New York: Prodist, 1974).

112/ Luft, "Health Maintenance Services."

113/ Inman, "Family Provision of Children's Health"; Colle and Grossman, "Pediatric Care"; and Goldman and Grossman, "Demand for Pediatric Care."

114/ This estimate pertains to the time cost elasticity of curative visits. Preventive visits are insensitive to time costs. For more details, see the note to Table 2.

115/ Manning and Phelps, Dental Care Demand.

116/ The price elasticities reported in the text were computed by Manning and Phelps at sample means.

117/ Manning and Phelps, Dental Care Demand, p. 23.

118/ A.G. Holtman and E. Odgers Olsen Jr., "The Demand for Dental Care: A Study of Consumption and Household Production," Journal of Human Resources, vol. 11 (Fall 1976).

119/ Manning and Phelps, Dental Care Demand.

120/ Edwards and Grossman, "Adolescent Health."

121/ Joel C. Kleinman and Ronald W. Wilson, "Are 'Medically Underserved Areas' Medically Underserved?', Health Services Research, vol. 12 (Summer 1977).

122/ Colle and Grossman, "Pediatric Care"; Manning and Phelps, Dental Care Demand; and Edwards and Grossman, "Adolescent Health."

123/ Manning and Phelps, Dental Care Demand; and Edwards and Grossman, "Adolescent Health."

124/ Mark V. Pauly, Doctors and Their Workshops (Chicago, Ill.: University of Chicago Press for the National Bureau of Economic Research, forthcoming).

125/ Edwards and Grossman, "Adolescent Health."

126/ Technically, Edwards and Grossman estimate the impact of each program from the solved reduced form of an oral health production and preventive care demand model.

127/ Manning and Phelps, Dental Care Demand.

128/ Lewit, "Experience with Pregnancy."

129/ Colle and Grossman, "Pediatric Care."

130/ Edwards and Grossman, "Adolescent Health."

131/ National Center for Health Statistics, Preventive Care.

132/ Colle and Grossman, "Pediatric Care.

133/ Edwards and Grossman, "Children's Health and the Family."

134/ In the long run, NHI might result in a reduction in family size by making contraceptive information and abortion more readily available. Also in the long run, income transfers could narrow schooling differentials by making it easier for low-income families to finance a college education for their children.

135/ Bureau of the Census, Statistical Abstract of the United States, 1978 (Washington, D.C.: U.S. Government Printing Office, 1978).

136/ For an excellent treatment of health-related externalities with a focus on merit externalities, see Pauly, Medical Care at Public Expense.

137/ Mark V. Pauly, "Overinsurance and Public Provision of Insurance: The Role of Moral Hazard and Adverse Selection," The Quarterly Journal of Economics, vol. 88 (February 1974).

138/ For a similar conclusion see Ehrlich and Becker, "Market Insurance." Zeckhauser, Pauly, Phelps, and others have constructed models in which moral hazard is present even in the absence of preventive

care. Here the concept refers to a substitution of remedial medical care for other consumption goods in general due to insurance-related reductions in the price of care. Since preventive and remedial care are likely to be good substitutes, it seems more natural to use the concept developed in the text. See Richard Zeckhauser, "Medical Insurance: A Case Study of the Tradeoff Between Risk Spreading and Appropriate Incentives," Journal of Economic Theory, vol. 2 (March 1970); Pauly, Medical Care at Public Expense; and Charles E. Phelps, "Demand for Reimbursement Insurance," in The Role of Health Insurance in the Health Services Sector, edited by Richard Rosett (New York: Neale Watson Academic Publications, 1976).

139/ Another reason for the government to modify the preventive care decisions of its citizens is that they may have imperfect information about the effects of care. A special case of imperfect information, which is particularly relevant to children's health and closely related to externalities, arises because parents' health affects the health of their offspring. Parents may ignore or may not be aware of these effects when they decide how much to invest in their health. (For an interesting model along these lines, see Edward Lazear, "Intergenerational Externalities," National Bureau of Economic Research Working Paper No. 145, 1976). We do not deal with imperfect information because it will almost always be more desirable for the government to deal with the problem directly than to subsidize the price of care. In the case of parent-child externalities, since these pertain to a small number of people in the same family, they

are likely to be small and to be internalized by the family in a number of ways. Moreover, the issue of imperfect information most frequently is raised not in the context of the effects of preventive care but in the context of the quality of physicians (for example, Pauly, Medical Care at Public Expense).

140/ If ΔM_i denotes the change in medical expenditures of the i^{th} income group required to achieve optimality, and if income groups are listed starting from lowest,then optimality requires:

$$\Delta M_1 > \Delta M_2 > \Delta M_3 \geq 0 \quad .$$

Hence optimality requires:

$$S_1 \Delta P_1 > S_2 \Delta P_2 > S_3 \Delta P_3 \geq 0$$

where S_1 stands for the effect on medical care of the i^{th} group resulting from a unit change in the price of care (with all S_i negative), and ΔP_i is the reduction in the price of medical care for the i^{th} group. Therefore the pattern of ΔP depends on the size and pattern of the S_i. In particular if

$$|S_1| > |S_2| > |S_3|$$

It follows that the optimal price cuts need not be inversely related to income throughout the whole range of incomes. Quite conceivably the optimal price cut could be greater for those with modest incomes than for the very poor.

141/ It is well known that, unless total consumption of some persons (say the poor) enters the utility functions of others, price reductions of specific merit goods are preferable to income transfers. Indeed, price reductions may be preferable even if the merit good in question is total present and future consumption of poor children rather than consumption of all poor persons. Poor parents would receive income transfers directed at their children and might spend them on their own consumption. To avoid this, the rich might prefer to subsidize health and schooling investments of poor children which would raise their earnings prospects and hence their future consumption.

142/ The properties of the private demand functions for health and the differences between this demand function and the demand function for medical care are analyzed in detail by Grossman. See Grossman, The Demand for Health.

143/ The above statement pertains to gross schooling or race differences in health. Net (income-constant) differences would be unaffected unless the price reduction or income transfer depended on race or schooling as well as on income. Undoubtedly, the transactions costs of a program whose benefits depended on many characteristics of consumers would be prohibitive.

144/ Phelps, "Illness Prevention."

145/ If future research provides definitive evidence on the efficacy of screening for certain adult diseases, possibly in subsets of the population, coverage could be expanded to include the administration of these tests to groups with high prevalence rates.

146/ To the extent that smaller dollar weights are placed on improvements in oral health relative to physical health, the above statement would have to be qualified. Nevertheless, if the impact of preventive doctor care on physical health is nill, coverage cannot be justified regardless of the size of the dollar weights.

147/ Fuchs interprets these trends as a form of "pre-commitment." See Victor R. Fuchs, "Economics, Health, and Post-Industrial Society," Milbank Memorial Fund Quarterly, vol. 57 (1979). Phelps develops a model that explains them in terms of situations in which consumers and insurance companies share the gains of preventive care activities by consumers. Another factor is that employers' contributions to fringe benefits are excluded from employees' taxable income. Therefore, the price of preventive care is reduced if it is financed through a work-related health insurance plan. As income and hence marginal tax rates rise over time, the incentive to finance preventive care in this manner increases. See Phelps, "Illness Prevention."

148/ See Howard Greenwald, Selwyn Becker and Michael Nevitt, "Delay and Noncompliance in Cancer Detection - A Behavioral Perspective for Health Planners," Milbank Memorial Fund Quarterly, vol. 56 (1978).

149/ Inman is the only researcher who has tested this proposition. His results are inconclusive. This is not surprising since they pertain to pediatric care which is not efficacious. See Inman, "Family Provision of Children's Health."

150/ Health Insurance Institute. Health and Health Insurance: The Public's View (Washington, D.C.: The Health Insurance Institute, 1979).

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