are not, and, unless highly proficient in English or French, are seriously handicapped in taking part in meetings. At present, the Volkswagen grant has been either expended or committed, and since the conference does not yet legally exist, it is operating on funds voluntarily offered by the member nations. The amount for this year is set at $478,000, and about 80 percent of this has been delivered or promised. Those who back the conference point to this voluntary support as solid evidence of government interest. But there is also evidence pointing in the other direction. Britain, which is slated for 20.8 percent of the costs, is doing quite nicely on its own in molecular biology, and many of its workers in this field doubt the wisdom of sending abroad scarce resources that could be used profitably at home. (The 1 November issue of *Nature* contains a detailed account of a meeting at the Royal Society in which this matter was thrashed out.) In any case, a framework exists for European cooperation in molecular biology, but, beyond a lot of hope, talk, and a bit of money, there is not much inside that framework.

The once-bright hope, but long-standing despair, of European scientific and technological cooperation is, of course, Euratom, which may well be moving now into the terminal stage. For nearly 2 years it has been operating on sharply reduced, provisional budgets. Even such financing now seems to be beyond the interest of its Common Market sponsors. Last month, following the latest in a long series of failures to agree on a budget, Euratom workers took to public demonstrations. And Euratom ran a large advertisement in the international *Herald Tribune,* announcing the probable availability for new employment of substantial numbers from its scientific and technical staffs.

It is no consolation for the American scientific community, but the fact is that, on the whole, Europe does not offer a healthy contrast to the situation that prevails in the United States.

—D. S. GREENBERG

Medical Care: As Costs Soar, Support Grows for Major Reform

Less than 5 years after the United States government entered the health care business on a large scale, Medicaid is widely acknowledged as a disaster, Medicare is costing more than had been anticipated, and the average citizen's medical bills are rising three times faster than the cost of living. As a result, support is spreading for radical reform in both the financing and delivery of medical care.

In money terms, the federal government has certainly stepped up its effort to improve medical care: ten years ago it spent $1.1 billion on personal health care; in 1969 it spent $11 billion, a tenfold increase. But, some experts say, this increased federal involvement has exacerbated the crisis in health care by investing more money and involving more patients in an inefficient system without reforming that system.

Fee-for-Service Care

At the core of the present system of medical care delivery is the fee-for-service principle. Among people who can afford it, the prevailing pattern is based on payment to the doctor for services rendered; for certain higher medical expenses such as hospitalization, the patient is reimbursed by a private insurance carrier with which he has a policy. When Medicare and Medicaid were being debated, their supporters argued that the people who most need medical care, the elderly and the poor, cannot afford fee-for-service care and, to get any care at all, they must settle for the inferior care of the overcrowded, understaffed outpatient clinic of the municipal hospital. Medicare and Medicaid, although structurally quite different, both attempt to correct this inequity by providing the means for the elderly and the indigent to take advantage of fee-for-service medicine.

Because they deal with different groups and have different structures, Medicare and Medicaid—which together cost the federal government over $6 billion in 1968—have had dissimilar records, with Medicare considered something of a success and Medicaid a total failure (see box). In spite of their different structures and histories, Medicare and Medicaid have a common weakness, shared also with private insurance carriers, which critics consider the primary reason for the inefficiency of health care delivery and for the inflationary cost spiral. They all dole out money to providers without giving any incentives to the providers to lower their rates. Just as Blue Cross reimburses hospitals on the basis of "reasonable costs" but offers no bonus to the hospital that tries to keep costs in line, so Medicare and Medicaid fail to reward economies. Medicare, for example, reimburses patients on the basis of "reasonable charges" by their physicians, which essentially means whatever the doctor can square with prevailing community rates, nature of the service, and self-assigned value of his own time.

Medicaid permits the state to choose its own financing mechanism but recommends Medicare-style financing. Thus, the doctors set the fees and the government pays them. With this de facto encouragement from government, doctors' fees have been increasing more than twice as fast as they were before Medicare and Medicaid were enacted. Because Blue Cross, Medicare, and Medicaid have a built-in tendency to cause fee increases and because the government programs have placed an increased patient load on an already overburdened fee-for-service medical care apparatus, costs to the health care consumer are skyrocketing. In 1960, a father of two children paid an average of $408 in medical bills, including insurance premiums and out-of-pocket payments. In 1969, it was $676—a 67 percent increase. Since the cost of living rose roughly 20 percent during the decade, medical costs have been increasing more than three times as fast as total costs.

These rapidly rising costs, plus increasing opposition to Medicaid from the states, the doctors, and the recipients, are the major elements of what President Nixon called in July a "massive crisis" in health care. There are other dimensions to the crisis, such as manpower shortages. But it is the financial squeeze that is bringing the crisis to the middle class and that has triggered a burst of discussion this year about the entire medical delivery system and ways to reform it. Already

there are half a dozen or more pieces of legislation in the works, and many of them are likely to get a hearing next year. Every proposal would eliminate Medicaid, and all would rely, at least in part, on health insurance as a financing mechanism. But there the bills divide into two divergent groups. The more conservative plans would extend private health insurance coverage to persons not covered now but would retain the present system of delivering and financing care. The more ambitious plans call for a compulsory national health insurance plan, which would be used as a financial lever to restructure the delivery of care and greatly reduce emphasis on the fee-for-service method of payment.

Restructuring Plans

The plan of the Committee for National Health Insurance exemplifies the more ambitious group of proposals. The committee is a 100-member group led by Walter Reuther and including three Senators, several deans of medical schools, and dozens of other well known people in and out of the medical profession. The committee expects to see a bill introduced in Congress early next year calling for compulsory national health insurance. (They prefer the word "universal" to "compulsory" because it sounds better to the consumer.) The plan would be financed by a combination of general revenue and a payroll tax on employers and employees. Every person in the country (regardless of how much, if any, he had paid into the plan) would have all his medical expenses paid, although some services, such as mental institutions, would be excluded at the outset. The purpose of the insurance plan, which would generate about $40 billion annually or more than two-thirds the total now spent on medical care by all parties in the United States, would be to give the government agency that administered it financial leverage over the health care system. "We look at universal health insurance," says the committee's executive director, Max Fine, "as a path to restructuring services."

Restructuring the health care system, explains Jerome Pollack, associate dean for medical care planning of the Harvard Medical School, means building in cost controls through incentives. "Medicare and Medicaid had only a timid first step toward controls in the form of a utilization review. Medicare has shown that a standard plan which accepts the present system is disastrous, and to extend Medicare to everyone would be even more disastrous. It would have been cute 100 years ago when Bismarck was doing it."

At the opposite end of the spectrum is the American Medical Association (AMA). It opposes any cost controls or incentives that would interfere with the concept of the entrepreneur doctor or the fee-for-service principle, which, they maintain, provides the best and most personal care. The AMA recently proposed a system of tax credits toward the purchase of health insurance, with lower-income persons getting larger benefits. Under the AMA proposal, three out of ten Americans would receive a total credit in the form of a certificate entitling them to free insurance. This plan, regarded by many as a stem-the-tide measure, would retain the present private insurance system and the fee-for-service mechanism by which they reimburse their clients. Opponents of the plan argue that its effect would be limited, if not nil, in controlling costs or in giving care to those who haven't been getting it, since private insurance pays only a third of all medical bills in the country even though it covers more than 85 percent of the people.

Between the restructuring plans like Reuther's (the AFL-CIO has a similar plan) and the AMA's tax credit plan is a third position. A large group of people say they recognize the need for structural reform but fear that plans like Reuther's—which would involve an unprecedented concentration of health monies in the federal government—will only induce inflation if imposed now on an inefficient delivery system. The Nixon administration has adopted this position. "My fear is that to impose health insurance on top of the system before we expand the supply of services

How Medicare and Medicaid Work

Medicare is an insurance program, modeled on the policies of private insurance carriers like Blue Cross–Blue Shield. It is divided into two parts: Part A, hospitalization coverage, is automatic and free for almost everyone over 65 (even if he is not eligible for Social Security payments); part B, medical insurance, which includes surgery and some other doctors' services, covers only those who sign up and pay monthly premiums. Part A is financed out of social security monies derived from payroll taxes, but part B is intended to support itself with matching federal grants. (The monthly fee has failed to keep pace with the costs of the program; it began at $3, was raised to $4, and is about to be raised again.) Medicare incorporates devices borrowed from private carriers for sharing costs between the carrier and the insured party: co-insurance, which means that the patient must pay a certain percentage of all bills; and deductibles, which means that the carrier pays no part of the first $50, say, in a given time period. Medicare is generally considered to be a successful program, although some critics complain it is too costly and others say that the deductibles and co-insurance leave the elderly with too many bills to foot.

Medicaid differs from Medicare in three major ways, all of which have been working to Medicaid's disadvantage. First, Medicaid is administered by the states separately (ten states had no Medicaid program at the beginning of this fiscal year). The federal government pays 50 to 83 percent of the costs of the program but has little control beyond setting guidelines. (Medicare is nationwide, with uniform standards.) Second, because it is an assistance program rather than an insurance program, Medicaid in most cases pays the provider directly, thus increasing paper work for doctors, whereas Medicare reimburses the patient (unless both doctor and patient prefer direct payment from government to the doctor). Third, Medicaid requires a test of each patient's eligibility—a proof of need. Each state sets its own eligibility requirements, within federal guidelines, and is responsible for reexamining recipients' eligibility at least once every 12 months. This procedure has made Medicaid costly, confusing, embarrassing to patients, and a nightmare of paper work. New York City's Commissioner of Hospitals, Joseph Terenzio, said recently that he knew of "hardly a single person" involved in programs of health care "who will not admit that Medicaid is a failure."

might create greater inflation and possibly freeze into permanence many of the faults we are trying to correct," says Roger O. Egeberg, assistant secretary for health and scientific affairs of the Department of Health, Education, and Welfare (HEW). But officials in the department admit that the amount of new monies to be devoted by the administration to expanding the supply of services will not be large. One official said that none of the administration's health programs of the next year will slow down escalating medical costs in the short run.

Responding to the pressure for change, HEW Secretary Robert Finch has asked his Medicaid task force to come up with a federal policy on national health insurance in the long run, since Egeberg states that the department opposes such a plan only for the present. But the Medicaid task force is chaired by Walter McNerney, the president of Blue Cross, the largest private health insurer in the nation. McNerney told *Science*, "I envision fewer carriers than we have now; we have 1700 and that's too many. But the idea of the private carrier will, I think, remain." McNerney agreed with Egeberg that the Reuther plan, which he called "not a plan but a list of specifications," would cause greater inflation. (The task force recommended last week that federal programs like Medicare and Medicaid assume some responsibility for actually providing care, but it has not yet reported on national health insurance.)

Replying to the criticism that a national health insurance plan would induce inflation, proponents claim that the insurance plan would incorporate the cost controls Pollack talks about, thereby making the system more efficient and reducing the tendency toward inflation. The restructuring—which would depend on a set of financial incentives which the Reuther group admits they have not yet worked out in detail and which some critics say they will not be able to work out—would encourage doctors to shift away from fee-for-service payment to a radically different mode of delivering and financing care: prepaid group practice.

Prepaid Group Practice

Prepaid group practice, which is already operating in this country on a small scale, is the heart of the reformers' effort. They believe it is a more efficient way of delivering medical care, better for patient and doctor alike. The plan calls for an organization of doctors working as a team to provide care to subscriber-patients who pay a set monthly fee. All the care, from general practitioner to specialist, is under one roof (some of the plans own hospitals too). But unlike clinical care for the poor, group practice plans provide each patient with his own family doctor who is responsible for referring him to specialists in the plan. A group of doctors who share a building or a receptionist do not constitute a prepaid group practice. There must be a set monthly fee for each patient, who contracts with the group as a whole, and income must be distributed to the doctors in a predetermined fashion.

Proponents of prepaid group practice claim it has two main advantages over the normal market mechanism: the patient is able to budget his medical costs predictably, instead of living with the specter of an illness that will impoverish him; and it is in the doctor's best financial interests to keep the patient healthy and out of the hospital, because he will be paid the same amount regardless (doctors in a prepaid group are either salaried or are paid on a capitation basis). Opponents of prepaid group practice argue that it provides impersonal care, that it is hard to see one's own family doctor on short notice and almost impossible in an emergency.

It is difficult to compare the care given in fee-for-service and prepaid group settings, for no good yardsticks of medical care really exist. There are about 200 consumer-oriented prepaid group practices in the United States and Canada, with three of them enrolling over 100,000 persons and one—Kaiser in California—approaching 2 million. Even the strongest proponents of prepaid group care admit the quality of care varies among them widely, just as it varies among private fee-for-service doctors. In dealing with the financial crisis in medicine, however, available statistics seem to bear out the claim of the advocates of prepaid group practice that their mode of delivery has an edge.

Statistics, of course, vary with the compiler: the AMA reported a study in 1964 which concluded that the two kinds of practice cost about the same and provided about the same quality of care. But the greater weight of evidence agrees with the findings of the National Advisory Commission on Health Manpower, which concluded in 1967 that patients in the Kaiser plan spend 20 to 30 percent less for all medical expenses and spend 30 percent fewer days in hospitals than others from the same region.

Although prepaid group practice has been growing (the Group Health Association of America says at least ten more communities around the nation are now organizing groups), the federal government has been extremely cautious. "Prepaid group practice has been talked about in the department for at least six years," says Dr. James Cavanaugh, deputy assistant secretary of HEW, "but there's never really been a move in that direction." The government has lent money to groups starting prepaid group practices (Group Health estimates that a minimum of $200,000 is required to start a plan) and is sponsoring a small number of fragmentary evaluation projects. But these positive efforts are more than offset by the discriminatory effect of Medicare and Medicaid against prepaid group plans. Medicare requires and Medicaid recommends that prepaid group plans be reimbursed in the same way as hospitals—on a "reasonable cost" basis—rather than on the "reasonable charge" basis by which private doctors are paid. The prepaid plans claim that, because they are more efficient, they show a lower cost than the private doctor charges for the same work. For this economy, they are penalized by receiving smaller revenues from the government programs. [The Social Security Administration recently announced a 3-year experiment with a prepaid group plan, the 800,000-member Health Insurance Plan (HIP) of New York, in which half of the money that HIP saves on its 55,000 Medicare patients will be refunded to the plan. Determination of savings will be made by comparing HIP costs with a sample of about 50,000 Medicare subscribers not on HIP. The administration has initiated cost-cutting experiments before, but this is the first one with a prepaid group plan.]

Cottage Industry?

There is little doubt that some new legislation will result from the steadily increasing interest that is evident in the delivery of health care. Unlike the Medicare fight, there is no issue here of government-in-medicine versus laissez faire. Even the AMA, through its tax credit plan, supports greater federal commitment to making health a right for all Americans. But on the question of major restructuring, with a shift toward prepaid group practice,

opposition is considerable. The AMA officially holds a hands-off policy toward prepaid group practice but certainly could not be described as a champion of the idea, and the government remains ambivalent. There is a deep philosophical split between two groups. The first, composed of a large proportion of health care planners and economists and a smaller proportion of physicians, criticizes medicine for being a "cottage industry." The second group, composed of a smaller proportion of the planners and a larger proportion of the doctors, would agree with Dr. Michael Halberstam of Washington, D.C., that "of course, medicine is primarily a cottage industry. So is the Catholic confessional and so is the process of human reproduction." (Dr. Halberstam explains his position in an article in the *New York Times Magazine*, 9 November.)

In the end, however, the greatest roadblock to restructuring health care may come not from doctors, since an increasing number of young doctors now coming out of medical school seem to favor group settings, but from the public. "You can get the doctors," says Dr. W. Palmer Dearing, executive secretary of the Group Health Association of America, "for they make quite a competitive salary in group practice. It's the consumer who must accept it; that's the crucial point." Dearing admits that consumers have "some fear" that prepaid group practice will treat them like outpatient clinics treat the poor. Regardless of the actual merits of prepaid group practice, in structure it does resemble care for the poor more than it resembles care now provided for those who can afford to pay their own way.

Proponents of group health plans say they are embarking on an ambitious program to educate the consumer about the benefits of group health plans. What may be the greatest educator, however —now beginning to overshadow the philosophical debate about the relative merits of two different modes of delivering care—is the cost spiral, which threatens to price medical care out of the range of most American families within the next few years.

—JOEL R. KRAMER

Postdoctoral Education: Report Emphasizes Recognition Problem

Postdoctoral scholars, by any test, form an academic elite but, at the same time, play an anomalous role in American universities. They have won the laurel of the Ph.D., but they are not quite faculty. They make important contributions to research, but they can seldom promote substantial support for their own projects. None of the ready generic titles—fellow or docent, for example—really fits all of them; they are left with the inelegant "postdoc."

Because of the peculiarities of their terms of employment, the postdoctorals have tended to be shadowy figures statistically. But a new National Academy of Sciences study, *The Invisible University: Postdoctoral Education in the United States*,* does a good deal to rescue them from limbo. The study, begun in 1966, was first suggested by Sanborn C. Brown of M.I.T., who became chairman of an advisory committee on the project.† That a need for such a study was felt is indicated by the financial support given by five federal agencies and the Alfred P. Sloan Foundation. Now, however, publication of the report has a particular timeliness, since the reductions in federal research support and the cuts in fellowships and training grants fall heavily on the postdoctorals. (The report estimates there are 16,000 of them.)

The report's primary conclusion is that the institution of postdoctoral study is a sound one. The key relationship, of course, is the one between the postdoctoral and his mentor, and if the survey and interviews undertaken for the study reflect reality, the relationship in a majority of cases is a mutually satisfactory one. The faculty mentor finds in the good postdoctoral an able apprentice who can manage research in the laboratory and who often brings with him good research ideas and techniques from another laboratory.

The authors of the report found that recent Ph.D.'s bent on pursuing university careers view a postdoctoral term as desirable, since they have spent several years in highly specialized work and do not feel ready to take on graduate students until they have broadened their scientific horizons. In the most practical terms, postdoctoral experience has become a virtual requirement—in the natural and life sciences, at least—for researchers who aspire to careers at universities that put heavy emphasis on research.

The authors regard postdoctoral education as a natural growth which accompanied the expansion of graduate education. They suggest that the ambiguity of the postdoctoral's position is determined not by their value in graduate education and research but by their status. Postdoctorals are academic birds of passage. They come to a lab-

Number of Ph.D.'s and percentage taking immediate postdoctoral appointment, by field of doctorate.*

Field of doctorate	Number of Ph.D.'s and percentage taking postdoctoral by year of Ph.D.					
	1963 Ph.D.'s	Taking postdoc	1965 Ph.D.'s	Taking postdoc	1967 Ph.D.'s	Taking postdoc
	No.	Percentage	No.	Percentage	No.	Percentage
Mathematics	484	8.4	684	7.0	828	6.9
Physics and astronomy	818	19.0	1,046	21.6	1,295	26.1
Earth sciences	322	9.6	374	10.2	419	12.3
Chemistry	1,288	30.4	1,439	33.2	1,764	32.6
Engineering	1,357	6.4	2,068	6.8	2,581	4.8
Agricultural sciences	373	9.7	480	10.6	517	8.1
Biochemistry	300	49.6	391	53.9	495	58.1
Other basic medical sciences	488	29.1	688	34.8	814	35.7
Biology	808	20.5	975	23.6	1,114	25.7
Psychology	892	11.1	955	14.0	1,293	12.5
Social sciences	1,575	2.8	2,028	2.7	2,597	2.4
Arts and humanities	1,274	2.2	1,718	1.5	2,126	1.3
Education	2,130	0.6	2,727	0.9	3,442	1.0
Other fields	611	3.1	729	2.2	1,010	2.6
Total	12,720	10.9	16,302	11.6	20,295	11.6

* Source: NRC, Office of Scientific Personnel, Doctorate Records File.

* Available at $10 a copy from Printing and Publishing Office, 2101 Constitution Avenue, NW, Washington, D.C. 20418.

† The study director was Richard B. Curtis of Indiana University; he succeeded Robert M. Alberty of M.I.T., who served in the post for the first half year. Robert K. Weatherall of M.I.T. was associate director for institutional studies.