CALIFORNIA HEALTH MANPOWER: AN OVERVIEW OF TRENDS AND POLICY ISSUES

PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF HEALTH

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PREFACE

This report, examining health manpower policy issues, summarizes Rand work for the California Health Department. The companion publication, R-1481-CHD, Medical Manpower Models: Need, Demand and Supply, by R. Lave, L. Lave and S. Leinhardt, forthcoming, analyzes alternative methods to estimate health manpower requirements.
SUMMARY

INTRODUCTION

This report presents an overview of certain health manpower trends and policy issues of concern to California policymakers. Hypothetical health manpower goals are defined as a framework for the succeeding discussion of supply and distribution of physicians and nurses, medical education, health manpower licensure and planning.

PHYSICIAN AND NURSES SUPPLY

A major weakness of approaches utilized to estimate manpower requirements is that they have failed to incorporate adequate measures of the impact of health services on individual health status and to utilize methods and assumptions that generate a wide range of forecasts. Because there is no consensus about how best to estimate manpower requirements and complex factors that influence physician location, state planners and policymakers alike are beset with considerable uncertainty regarding the desirability and impact of alternative actions.

Our analysis of physician supply trends indicates the following:

- Physician supply in both California and the nation has been increasing at a faster rate than population growth.
- Physician supply has grown largely because of the significant increases in U.S. medical school graduates. While California produces a relatively small share of U.S. medical school graduates, this percentage has been gradually increasing in recent years.
- Projections indicate that both U.S. and California medical school graduates will increase substantially between 1973 and 1980 at an approximately equal rate—an rate that is more rapid than projected population growth.
- California is unusually fortunate in having a large proportion of its medical school graduates remain to practice in the state.
Despite California's success in retaining its own graduates, there are not enough to meet the demand for health services, and California is heavily dependent on immigration from other states for the lion's share of its physicians.

A significant component of physician immigration to California consists of interns and residents who have taken their undergraduate medical education at a school outside California, which attracts substantially more interns and residents than its medical schools produce. Moreover, California's share of U.S. interns and residents has been gradually increasing.

Private medical school graduates are more likely to leave their state of graduation than are public medical schools graduates. California has attracted a large share of private medical school graduates.

While the number of foreign medical school graduates in the United States has increased substantially in recent years, California has employed relatively few, and this number is decreasing.

Physician supply trends indicate that California and the nation will probably experience increases in numbers of physicians and in physician population ratio through 1980 by about 3 to 4 percent annually. Critical for California physicians' supply will be potential shifts in federal policy reducing the institutional support that has largely resulted in medical school enrollment increases, the extent to which physicians will continue to migrate from other states and California's attractiveness to graduates of its own medical schools.

Some authorities argue that, because physicians can determine the demand for their own services, an increase in supply will cause them to deliver unnecessary care, that a taut supply would encourage increases in productivity, and that there is no agreement on whether aggregate supply increases will result in lower fees or better physician distribution.

It would be inaccurate to assume that all physicians should be equally distributed around the state, inasmuch as various specialists require a large population base to support their practice and therefore would not have enough patients to support a practice. It can
be argued that primary care physicians should be more equally distributed geographically than all physicians, and this is in fact the case in California. Disparities between major metropolitan areas and other areas still exist for primary care physicians, but these disparities are not as great as those for physicians as a whole. Aggregate growth in physician supply in recent years has resulted in physician to population ratio increases in all of the state's geographic areas, but particularly in isolated rural areas. However, major increases occurred in the major metropolitan areas, which already have comparatively high ratios. Bakersfield and the Imperial and San Joaquin Valleys appear to have the greatest physician supply deficiency. Areas there have comparatively fewer total as well as primary care physicians, and show a decrease or only a slight physician to population ratio increase between 1963 and 1971. It is questionable whether increases in future aggregate physicians' supply will significantly improve distribution.

Our analysis of nurses supply trends indicates the following:

- The supply of registered nurses (RNs) has increased substantially in recent years while that of licensed vocational nurses has grown even more rapidly.

- Nurse registrants are not an accurate indicator of nurse activity because many nurses do not work or work only part time. LVNs appear to have higher labor force participation than RNs.

- The nurse to population ratio of active RNs and LVNs has been increasing; 1970 standards set by the 1963 Report of the Surgeon General's Consultant Group on Nursing have been met.

- California benefits substantially from nurse migration, but dependence on nonstate sources of supply has declined with increases in California graduate licensees.

- California nursing program graduates and admissions have increased dramatically in recent years, and California nursing graduates have increased more rapidly than nursing graduates for the United States as a whole.

- It appears that nursing schools are planning further program expansion.
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- Increases in admissions to RN programs between 1971 and 1972 were smaller than for any period in the last five years, primarily due to declines in Diploma programs.
- While urban-rural differences dominate the RN distribution pattern, LVNs are distributed more evenly in rural areas.

Of interest is that recent informal surveys by the Board of Nurse Education and Nurse Registration revealed that many nurses were unable to find employment in Sacramento, San Jose, San Francisco, Oakland and San Diego, and that community college surveys show that immediate job availability is low for newly graduated vocational and registered nurses in some areas of California.

MEDICAL EDUCATION

The state supports public medical education by providing funds for medical school instruction and research, clinical teaching at university hospitals, reimbursement for Medi-Cal patients, organized research, and bond funds for capital construction. A gross estimate of State General Fund support for direct medical education costs excluding overhead is approximately 25 to 30 percent of total direct costs. Other major sources of support are patient revenues and federal institutional and research grants and contracts. State costs are offset by federal overhead grant and contract payments to the state, which are estimated at over $12 million for the health sciences in 1974-75.

State expenditures for medical school operations bear no relationship to population or fiscal capacity, and California compared with other states ranks low on both counts, ranking 22d in state appropriations per capita for 1972-73 and 26th in expenditures per 100,000 population for the 1965 and 1966 academic years.

Because medical schools produce "joint products" (teaching, research, and patient care), there is no conceptually unambiguous way to allocate costs to specific outputs. This results in pressures by those who provide funding to pay a limited share of total costs.

A state may choose to increase or redirect its support for medical education to achieve a variety of objectives including (1) increasing physicians' supply; (2) providing medical educational
opportunity for its citizens; (3) improving specialty or geographic
distribution of services, and (4) improving the quality of care. Serious
questions can be raised about the need to support continued expansion
of undergraduate medical education merely to increase the aggregate
supply of physicians in the state, inasmuch as California benefits
substantially from physician migration, can anticipate physician to
population ratio increases at least through 1980, and has not realized
substantial distributional benefits from past aggregate supply increases.
Moreover, there is no evidence that increasing the number of in-state
graduates has no effort on immigration. Thus state investment in
undergraduate medical education enrollment expansion is likely to be
costly and ineffective.

Alternatively, enrollment expansion may be justified in California
to increase educational opportunity for California residents since
California in 1971 ranked 42d in entering students per capita and had
the 3d lowest acceptance rate. If expansion is undertaken primarily
to provide career opportunities which result in substantial private
benefits to individuals, a strong argument can be made for increasing
tuition if liberal loans and repayment provisions are made available.

Enlarged support for graduate medical education has a variety of
potential benefits to California since availability of house staff
positions, particularly at university-affiliated hospitals, helps
attract physicians to the state and to particular areas where these
institutions are located. House staff also provides a significant
amount of patient care. In December 1972 interns and residents com-
prised 14 percent of total patient care physicians in California.
Moreover, distribution of house staff by specialty and geography sig-
nificantly affects type of future practice and location.

If professional criteria are used to assess overall specialty
distribution in California, more primary care physicians are needed
and probably fewer surgeons. In response to increasing pressure from
both the Legislature and the Department of Finance, the University of
California has increased residencies in primary care fields and set a
goal that 47 percent of its residencies would be in these fields by
1977-78 as compared with an estimated 30 percent in 1972-73. The University also proposed to strengthen family practice programs but has rejected the notion that this could best be implemented by establishing family practice departments. One problem associated with strengthening primary care programs is the relative high costs of teaching hospital outpatient clinics when compared with private non-teaching settings, primarily because third party insurers do not cover ambulatory setting educational costs and because prices for these services are constrained by competition with local physicians. These educational costs must be borne elsewhere. This cost pressure makes it difficult for medical schools to support teaching hospital based ambulatory care.

Inasmuch as the cost and location of medical schools and affiliated hospitals influence both state expenditures and the distribution of care, important policy issues for the state are the location of such facilities and the extent to which every medical school requires its own on-campus teaching hospital. The University has requested funds to develop a medical education program in the Fresno area to better meet the needs for training opportunities and improvement of care in that predominantly rural area. After examining diverse institutional arrangements in other states, the Joint Committee on Siting of Teaching Hospitals concluded that "every medical school does not require its own teaching hospital" because of cost savings and training opportunities "more relevant to the preparation of needed primary care physicians." The University, however, has taken the position that an on-campus teaching hospital is essential for teaching research and specialized care.

Federal health manpower legislation has had a significant impact on California. The Comprehensive Manpower and Training Act of 1971 has supported a major increase in medical school enrollment that has benefited California since many graduates from other states locate here. If funding for this program is reduced and schools are required to maintain their enrollments to continue receiving aid, then they will face the option of increasing tuition, obtaining increased state funds, or enlarging support generated by clinical faculty medical practice.
The state should carefully review the effect on California of proposed federal changes.

**HEALTH MANPOWER LICENSURE**

Various authorities have concluded that health professional licensure laws originally established to protect the public from abuse have resulted in limiting the rational allocation of manpower resources through unnecessary requirements that block proper delegation of tasks and inhibit career mobility. Most state licensing boards are composed of representatives of regulated groups and generally are concerned with professional interests rather than improvements in health.

We have reviewed various suggestions for improving manpower licensure. These are generally aimed at achieving the following objectives:

- To reform licensure boards by creating a single health manpower regulatory entity, consolidating several existing boards, improving coordination between separate boards, and increasing public and interprofessional membership.
- To eliminate unnecessary legal barriers to improved productivity, career mobility, and innovation by supporting (1) experimental programs aimed at assessing different roles and education approaches; (2) greater use of proficiency and equivalency exams; (3) licensure for "nurse practitioner" and other "expanded role" professionals; (4) analysis of tasks and scope of practice of various professionals as a basis for redefinition of scope of practice and educational requirements; and (4) implementation of "institutional licensure" which integrates personnel and facility regulation.
- To improve regulation of quality beyond entrance through continuing education and specialty licensure.
- To facilitate improved geographic and specialty distribution by specialty or geographic licensure, e.g., restrictions to practice by area.
To facilitate geographic mobility by enlarging utilization of national examinations.

To evolve a system responsive to change and related to patient care requirements by better relating licensure requirements to performance standards and avoiding proliferation of licensed health occupations.

Various steps have been taken and proposed in California to achieve some of these objectives. We have reviewed implementation of 1970 physician's assistant legislation and find that narrow interpretation of this law appears to have impeded achievement of its objectives to relieve overworked physicians in rural areas and to improve productivity in medical care delivery. While nurse practitioners have not been legally authorized to undertake medical tasks, there are many nurse practitioner training programs in California. The Board of Medical Examiners has estimated that there are about 690 graduates or prospective graduates of such programs and that many of these are practicing in California. Obviously, nurse practitioner graduates will face considerable uncertainty and run risks if they practice beyond the scope of the nurse practice act unless questions regarding their appropriate scope of practice and approval of their educational programs are resolved.

HEALTH MANPOWER PROGRAMMING

Many have suggested that the current medical care delivery system is tangential to improvements in health and that public funds could be spent with much greater return on such non-medical care expenditures as income support, general education, transportation, housing and health education. Despite conflicts about health manpower goals and uncertainties involved, it is necessary for the state to establish broad, flexible health objectives to provide a framework and guide for manpower planning.

California’s major effort to develop health objectives was contained in the State Plan for Health released in 1971. This was a significant first step and involved broad participation of producers and consumers of health services. As a first step, however, the Plan
gives little attention to institutional arrangements and processes to sort out, mold consensus for, or implement its recommendations. The recent creation of a single Health Department provides a more consolidated framework for updating the plan. To conduct comprehensive manpower planning, it is in our view necessary to involve higher educational institutions, licensure boards and finance and legislative agencies in the planning process, as well as to develop a more useful intelligence system to provide the data and analysis necessary for decisionmaking.

RECOMMENDATIONS

We find that new institutional arrangements and organizational changes are necessary to develop and implement state health manpower objectives and policies. We therefore make the following recommendations:

1. To improve the interface between health sciences education and the health delivery system we propose that the new Postsecondary Education Commission, with the assistance of a broad based advisory committee of state health, finance, and licensure officials, be mandated on a continuing basis to develop and update a Health Sciences Education Plan that would serve as a basis for state resource allocation to public and private higher educational institutions. Such a plan should be based upon state health goals articulated in an updated State Plan for Health. Designees of the commission should also help determine these goals through direct involvement in their preparation.

Alternatively the Health Sciences Education Plan could be developed by the Health and Welfare Agency, the Health Department, or an independent commission.

2. The University of California should review the desirability of increasing medical school tuition, provided that liberal loan and repayment systems are available. Because private benefits of medical education are substantial, those who receive such benefits should pay a larger share of the costs.

3. A focal point should be created in the State Health Department to monitor national and state trends and actions of the federal
government that may have significant impact on manpower supply and
distribution in California

4. The State Health Department should also:

- Study the desirability and feasibility of creating
  a single personnel licensure system.
- Encourage continued experimentation and evaluation
  of pilot projects utilizing health personnel in
  new roles.
- Support legislation authorizing expanded role
  practice for nurse practitioners.
- Closely monitor demonstration projects aimed at
  testing institutional licensure and examine the
  feasibility of establishing a demonstration in
  California.
- Undertake surveys immediately to determine
  employment opportunities for nurses and
  specifically the extent to which such opportunities
  may be declining, as a guide for planning educa-
  tional programs and counseling students.
- Undertake a comprehensive study in cooperation
  with other appropriate agencies to evaluate the
  costs and benefits of alternative approaches to
  provide continuing education for the health
  professions.
- Develop experimental and demonstration programs
  to encourage nurses to expand their labor force
  participation.
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I. INTRODUCTION

This report is intended to help California Health Department officials assess alternative approaches and institutional arrangements to deal with certain emerging trends and policy issues in the field of health manpower. It is based primarily on review of health manpower literature and interviews with state officials, researchers, and providers of health services. The report does not present the findings of definitive, original research examining the full range of major manpower questions facing California. Rather, it primarily attempts to put together an overview of a variety of state activities that affect health manpower supply and distribution, and to raise and hopefully shed light on current policy issues requiring further state analysis and action. It is also intended to provide information on recent trends to aid interested students and practitioners.

A variety of governmental and private actions influence the supply and utilization of manpower resources in the labor intensive health care industry, which now ranks as the third largest employer in the United States. All of the following play a substantial role in determining health manpower requirements: financing, technology, facility location and regulation, patterns of health care delivery, scope and nature of services provided, licensure and certification of personnel, programs of training institutions, and the activities of professional groups. Moreover, changing patterns of health delivery and financing and lack of knowledge about health production functions (e.g., the most effective combination of resources required to produce certain outcomes) make manpower requirements projections highly uncertain.

Given these uncertainties, previous Rand research suggests that state health manpower planning and policymaking focus on analysis of intermediate run policies that emphasize policy instruments over which the state has some control and on measures that are likely to affect the state's abilities to meet its goals. This approach would explicitly
recognize uncertainties and stress flexibility. It would emphasize
design of systems responsive to change. ¹

HEALTH MANPOWER GOALS
What are state health manpower goals? Inasmuch as manpower
planning and policymaking rest on certain assumptions about state
objectives, we have attempted to define some hypothetical state health
manpower goals to serve as a framework for the succeeding discussion.
These goals illustrate the activities that fall within the scope of
state health manpower concern.

1. To assure an adequate or optimal supply and distribution
   of different types and combinations of health manpower
   needed to produce health services and improve the
   population's health status.
2. To protect the public from abuse and to upgrade the
   quality of health services.
3. To improve the productivity of health training and
   delivery systems.
4. To provide educational and career opportunities for
   state citizens.
5. To develop the capability to analyze manpower trends
   and policy issues as a basis for planning and decision-
   making.
6. To develop institutional arrangements utilizing and
   coordinating the full range of resources available
   to the state to meet its manpower objectives.

Unfortunately, current knowledge provides no generally agreed
upon objective basis for determining the need, optimal supply, or,

¹J. Acton and R. Levine, State Health Manpower Planning: A Policy
distribution of health manpower or the relationship of medical care services to health status. As our companion report and others have pointed out, if the state were to place greater emphasis on improving the population's health status, it would probably concentrate on public health and health education measures aimed at promoting individual actions conducive to health maintenance rather than increased support for medical care.

To maintain an adequate or optimal supply of health manpower (leaving aside for the moment what adequate or optimal means), the state is concerned not only with the output of training institutions and retaining those health professionals educated within the state, but also with the magnitude of immigration from other states and countries as well as public policies affecting that immigration.

Even though a state may have an adequate aggregate manpower supply, many of its people may not have access to needed health services because the supply is not well distributed by medical specialty (primary care versus specialty care) or geography (rural versus urban). Policies to influence manpower distribution may take the form of incentives to influence location or practice decisions (i.e., loan forgiveness, increase in primary care residencies, location of an academic medical center).

Activities designed to protect the public from abuse and improve care are state manpower and facilities licensure laws and certification and accreditation procedures of professional bodies, reimbursement controls, court determinations in malpractice actions, utilization review, surveillance, and enforcement. Quality of care, however, is most difficult to define objectively, and present implementation structures depend heavily on professional peer judgment to measure it.

Improvements in productivity resulting from various changes in the health care system, many of which are difficult to assess, may affect

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manpower supply and distribution requirements. The need for different types of manpower will be affected by reallocating tasks among different types and combinations of personnel (i.e., physicians, nurses, auxiliaries, use of health teams); changing delivery modes (i.e., group practice, HMO, etc.); financing (i.e., national health insurance); making greater use of transportation and communications (i.e., transporting patients to doctors or vice versa or improving communications between existing health personnel and medical knowledge via television or computer); or findings of biomedical research (i.e., cures for major disease). The state may influence productivity by its own health care program, systems of licensure, financing and education, and its willingness to support experimental efforts in these fields.

Clearly within the realm of state action are improvements in training methods or programs that produce manpower more efficiently or measures that generally encourage more effective utilization of higher educational resources.

California training institutions are not presently able to meet student demand for health science training; however, such demand must be balanced with the need and demand for the services of health professionals and the costs and benefits to all the state's citizens derived from increased support for health sciences education. Moreover, students are not well served by educational programs that produce graduates for whom there are no jobs or that unnecessarily increase the demand and cost of services.

Responsibility for decision and action to determine and achieve manpower objectives is now fragmented in the hands of many state agencies, providers of health care, and public and private training institutions. Policies to implement state health manpower goals involve public and private educational institutions, boards that presently license health professionals, and Health Department activities concerned with manpower planning and training, facility regulation, financing, and service delivery.
An important question for the state, then, is how to develop institutional arrangements that will provide a framework for continuously determining its health manpower goals and coordinating policies to achieve them.

A key element in such a system is the development of analytic capability and data that will allow the state to examine alternative manpower goals and policies. We have stressed that because of state of the art limitations and major uncertainties, analysis may not provide the simple and straightforward answers of interest to policymakers concerned with health manpower. This fact notwithstanding comparisons can be made, trends examined and alternatives presented which, when critically reviewed and supplemented by subjective judgment, can provide a basis for decisionmaking.

We do not suggest that manpower considerations be viewed in splendid isolation from other health concerns. On the contrary, simple review of the hypothetical health manpower goals presented indicates the interrelationship of decisionmaking involving facilities, services, and manpower.

STRUCTURE OF REPORT

The following sections examine the supply and distribution of physicians (Sect. II), the supply and distribution of nurses (Sect. III), medical education (Sect. IV), health manpower licensures (Sect. V), a structure for health manpower programming (Sect. VI), and our overall conclusions and recommendations (Sect. VII).
II. SUPPLY AND DISTRIBUTION OF PHYSICIANS

This section briefly examines the following questions and how they relate to state health manpower planning and policymaking:

How many physicians do we need?
How can their productivity be increased?
What factors influence physician location decisions?
What are recent trends affecting the supply and distribution of physicians in California?

HOW MANY PHYSICIANS DO WE NEED, WANT, DEMAND?

Our companion report analyzes and evaluates alternative methods to estimate health manpower requirements and discusses factors influencing physician location decisions. A brief summary follows describing several of the key elements contained in that report. For our purposes, "needs" refer to medical services that professional experts have determined are necessary for good health. "Wants" are defined as medical services that lay individuals desire regardless of professional judgment, and "demand" is the care people desire for which they are able and willing to pay. Clearly, different estimates will result depending on whether the criteria for determining manpower requirements are "needs," "wants," or "demand."

The medical needs approach was employed by Lee and Jones in 1933, and since then by others, who solicited a consensus of professional opinion on what services would be required to treat various types of illness and then projected manpower requirements based upon the incidence of these illnesses among the population.

A second approach, a variant of the Lee-Jones method, uses experience of prepaid group practice as a criteria and projects requirements utilizing, for example, the Kaiser or other prepaid systems as the "ideal."

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3 Lave, Lave and Leinhardt.
A third method utilizes a certain existing or proposed physician
to population ratio as a standard. Requirements are then determined
based upon the existing ratio of those states with the highest physician
to population ratio, the current ratio, or one adjusted based upon
certain demographic characteristics, e.g., age or income.

A fourth approach estimates the economic demand for medical care
and projects manpower requirements based upon health condition, cost
(both monetary and nonmonetary, e.g., time or access), and other
variables. Some have argued that the demand for physician services
depends in part on the supply of physicians and that physicians
influence the demand for their own services—for example, by prescribing
certain regimens of care such as surgery, post-operative visits, and
continuing visits. Some studies suggest that the physician supply
itself determines the demand for physician services; e.g., the more
physicians there are the more medical care will be provided, and in
cases of abundance, care will be provided that either may be marginally
indicated or not needed at all. Thus the argument is made that too
many physicians may result in unnecessary medical care and higher prices.

And a fifth approach utilizes a model of the health delivery
system to examine the interrelationship of a variety of variables and
equations, thereby analyzing the potential impact of various proposed
health delivery system changes.

Each of the above methods has certain strengths and weaknesses.
One weakness they all share is the lack of adequate outcome measures.
They all use input measures (e.g., number of physicians and visits) as
surrogates for output instead of measuring the impact of services on
individual health status. Unfortunately, little is known about how
various health measures affect individual health status.

Besides lacking an outcome measure, the Lee-Jones approach
employing "ideal" requirements based upon professional judgment ignores
the extent to which people are willing to seek or demand those services
and the extent to which other medical personnel can be substituted for
physicians. This method therefore tends to overstate manpower require-
ments. Utilizing prepaid group practice experience as a standard
assumes that the nation's health care system can and will be structured as the Kaiser system is; those utilizing this system, however, comprise only 5 percent of the population, are self selected, utilizing care outside the system, and are mostly employed and "middle class." This approach then tends to understate manpower requirements.

The ratio approach, while simple and useful for short-term projections, assumes no significant changes in delivery system, technology, financing or productivity; masks wide variations in distribution patterns if only employed on a national or state basis; and assumes that whatever base period is employed is adequate. The approach assumes that the current system will continue and, based upon the reference criteria employed, will yield projections accordingly.

Furthermore, a certain physician population ratio does not adequately measure whether or not there is a "shortage" of physician services. Because the medical care market is not well functioning, much better indicators of shortages in a particular area than ratios are nonmarket rationing devices such as the inability to get service because a physician refuses to take new patients, long waits for an appointment or in the doctor's office, a short time with a physician, or other constraints on access to care.

This discussion highlights the uncertainties surrounding various manpower requirement estimating techniques. Specific national forecasts described in our companion report for 1970 all employed population estimates that were too high and produced a wide range of physician supply estimates, all of which proved to be too low—the highest estimate was lower than the actual number of physicians in 1970. Projections for 1975 have probably underestimated supply and, if one assumes increases in physician productivity, the supply deficit utilizing the criteria employed by these studies will have largely disappeared.

**IMPROVEMENTS IN PRODUCTIVITY**

A basic policy issue for both national and state policymakers is the extent to which the number of physicians should be increased as opposed to efforts aimed at improving the efficiency and effectiveness of medical care delivery. Rashi Fein noted:
The greater the fixation on manpower itself, the more likely it is that a search for ways to raise the productivity of that manpower will be ignored. The cost of focusing on the wrong target may, therefore, be high... Medical manpower policy should...ask whether goals can be reached in alternative less costly ways with fewer resources.  

Steward and Siddayao define three ways to achieve efficiency in the health delivery system:

- Improve allocation of resources to geographic areas or to the treatment of illnesses where the probability of improving health is greatest.
- Improve performance of health personnel in treating given conditions through better procedures, knowledge and information.
- Reduce the resources required to achieve a given output.

They suggest the following steps to improve productivity:

1. Redefine health service tasks to allow delegation of medical tasks to those with less training and to improve career mobility.
2. Group health personnel in organized settings (group practice, health care teams) to make better use of auxiliary personnel and to take advantage of other economies of scale.
3. Create closer linkages between hospitals to permit specialization for certain low-use services.
4. Use self-help units more extensively in hospitals where ambulatory patients are able take care of their rooms, dress themselves, and eat in the cafeteria.
5. Reduce regional inequalities that could possibly be accomplished if the structure of the medical industry was reoriented away from solo to group practice. Thus salaried

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physicians in hospitals or group practices would have fewer restrictions on mobility and could more easily relocate to other areas perhaps with fewer physicians. This institutionalization of medical care probably would have little impact on rural areas because of their relative unattractiveness. Such areas could probably be better served through improvements in transportation and communication as well as expanded use of paramedical personnel.

6. Intensify health education efforts. Inasmuch as most health problems are a function of personal habits (i.e., smoking, drinking, using drugs, dieting, exercising, genetic makeup, and accidents), increased investment in improving health habits could significantly affect health status as opposed to increased expenditures on medical care.

7. Expand research into the causes of and cures for major diseases, requirements for an adequate diet, measures to ameliorate the effects of environmental pollution, improve understanding and treatment of mental illness, and research on ways to improve the medical care delivery system itself.  

Many have suggested that much can be done to improve the productivity of the medical care system without increasing the supply of physicians. The extent to which productivity gains can be achieved, other things being equal, reduces the need for additional physicians.

**FACTORS INFLUENCING LOCATION**

Estimating physician requirements for a state becomes more complex than for the nation because the methods employed must also account for factors that influence physician location in a particular geographic area. This is particularly important in California because of its heavy dependence on physician migration from other states.

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At the state level the most significant factor that appears to determine physician location is population size and density. Fein and Weber conclude that "those states with substantial population increases attract new physicians, whether or not they are training them." Our companion report suggests that because physician incomes are so high around the country, locational decisions are more influenced by non-pecuniary

"professional and personal amenities and conveniences. These include leisure time (attained by a not overly demanding practice) and the effectiveness of non-price rationing procedures, medical resources, interesting case variety, income security, colleagues, and other qualities associated with large urban areas."7

Physicians appear to be attracted to states with medical centers and to areas with high educational levels and low agricultural activity. Yett and Sloan8 find a positive correlation between the number of so called "attachment events" (e.g., birth, medical school training, internship, and residency) occurring in an area and the likelihood that physicians will locate there, with most recent attachment events having the most influence on practice. Thus, residency location appears to be a strong determinant as does internship location.

Scheffler has also found a strong statistical relationship between the number of internships and residencies offered and the physician to population ratio.9 Other factors tending to affect physician location are per capita and physician income, state educational expenditures,

7Lave, Lave, and Leinhardt, p. 81.
8D. Yett and F. Sloan, Analysis of Migration Patterns of Recent Medical School Graduates, December 1971 (mimeograph).
and hospital construction. The most significant factor influencing location in a rural community appears to be rural background. Moreover, while 50 percent of all primary care physicians included in a 1972 Rand-AMA survey of geographic location made their practice decision during house staff training, those choosing rural practice were more inclined to make their practice decision before or during medical school. Interestingly, our companion report suggests that future physicians will be more willing than their present counterparts to accept both staff positions in institutional facilities and paraprofessional substitution.

SUPPLY TRENDS

Thus far, we have discussed various methods to estimate manpower requirements and have pointed out that no agreement exists on how best to assess them. Such assessment requires improved output and productivity measures as well as consensus on desirable health care goals (i.e., satisfaction of requirements based upon professional judgment versus public wants versus economic demand, and improvements in medical care versus health status). Improvements in productivity are possible, but their specific impact is difficult to estimate.

We have also pointed out that physician requirements for a state, in addition to the above-noted factors, depend on its ability to attract physicians from other states as well as to retain its own medical school graduates and practicing physicians. We now examine the physician supply in California. In this discussion we use the physician population ratio extensively. Despite its limitations it is probably the best method, given the state of the art, to simply describe and compare changes in physician supply and distribution. Recall that a certain ratio is not a measure of adequacy, does not consider differences in demand for medical care, forms of health delivery, or changes in technology. We first consider supply trends for the state as a whole and then examine specialty and geographic distribution.
AGGREGATE SUPPLY

Nine pertinent points apply to California's aggregate supply of physicians.

1. California's ratio of physicians per 100,000 population is much higher than the nation's but lower than that of several other states.

   In 1972, California had 41,000 nonfederal physicians or 12.6 percent of the national supply (326,000). California's physician population ratio was 23 percent higher than the nation at 200 per 100,000 as compared with 156 for the United States. 10

   In 1971, California ranked fourth among the states (including Washington, D.C.) in the number of active nonfederal physicians involved in patient care per 100,000 population. (D.C. 1st, 344; New York 2d, 198; Massachusetts 3d, 171; California 4th, 166). 11 These comparisons are presented merely to illustrate California's relative position with respect to the nation and other states. In addition to the limitations of employing a particular ratio as a standard, noted above, national and state ratios mask considerable regional and intrastate variation. We do not mean to imply that the U.S. ratio should be applied as a standard for California or that California needs to improve its ratio to that of New York.

2. Physician supply both in California and the nation has been increasing at a faster rate than population growth.

   Between 1960 and 1972 the ratio of all physicians in the United States increased 18.5 percent, from 141 to 167 (260,484 in 1960 to 356,500 in 1972). 12

   Table 1 shows the percentage change in California's physician supply. Between 1961 and 1972 the U.S. ratio of active nonfederal physicians involved in patient care increased from 122 to 129 (245,368 to 266,000).

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10 Unless otherwise stated, all ratios are per 100,000 population.
11 American Medical Association, Distribution of Physicians in the U.S., 1971, Table 1, p. 9.
Table 1

NUMBER OF PHYSICIANS, PHYSICIAN POPULATION RATIOS, AND PERCENT CHANGES IN CALIFORNIA: DECEMBER 1969 THROUGH DECEMBER 1972

<table>
<thead>
<tr>
<th>Type of Physician</th>
<th>12/69</th>
<th>12/70</th>
<th>12/70</th>
<th>12/71</th>
<th>12/71</th>
<th>12/72</th>
<th>Percent Change</th>
<th>Overall Percent Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total nonfederal</td>
<td>36,700</td>
<td>38,000</td>
<td>39,400</td>
<td>39,016</td>
<td>36,488</td>
<td>41,000</td>
<td>+ 3.0</td>
<td>+ 1.3</td>
</tr>
<tr>
<td>Active nonfederal</td>
<td>33,699</td>
<td>34,956</td>
<td>36,016</td>
<td>33,010</td>
<td>33,606</td>
<td>36,488</td>
<td>+ 3.4</td>
<td>+ 1.8</td>
</tr>
<tr>
<td>Patient care</td>
<td>30,794</td>
<td>31,934</td>
<td>33,010</td>
<td>26,466</td>
<td>27,038</td>
<td>27,716</td>
<td>+ 2.4</td>
<td>+ 2.2</td>
</tr>
<tr>
<td>Office based</td>
<td>25,045</td>
<td>25,850</td>
<td>6,544</td>
<td>6,568</td>
<td>4,716</td>
<td>4,716</td>
<td>+ 7.6</td>
<td>+ 0.4</td>
</tr>
<tr>
<td>Hospital based</td>
<td>5,749</td>
<td>6,084</td>
<td>4,163</td>
<td>4,256</td>
<td>4,683</td>
<td>4,716</td>
<td>+ 5.8</td>
<td>+ 14.2</td>
</tr>
<tr>
<td>Training program</td>
<td>1,586</td>
<td>1,828</td>
<td>1,861</td>
<td>1,852</td>
<td>1,852</td>
<td>1,852</td>
<td>+ 15.3</td>
<td>+ 0.5</td>
</tr>
<tr>
<td>Full-time staff</td>
<td>2,905</td>
<td>3,022</td>
<td>3,006</td>
<td>2,882</td>
<td>2,882</td>
<td>2,882</td>
<td>+ 4.0</td>
<td>+ 0.8</td>
</tr>
<tr>
<td>Nonpatient care b</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Civilian population (000) | 19,542 | 19,797 | + 1.3 | 20,054 | + 1.3 | 20,288 | + 1.2 | + 3.8 |

| Ratios per 100,000 population |       |       |       |       |       |       |       |       |
| Active nonfederal | 172.4 | 176.6 | + 2.4 | 179.6 | + 1.7 | 179.85 | + 0.25 | + 4.3 |
| Patient care     | 157.6 | 161.3 | + 2.4 | 163.6 | + 2.0 | 165.6  | + 1.0  | + 5.1 |


a Includes interns and residents.

b Includes full-time teaching, administration, research, and other activities outside the patient care area.

c Figures estimated by CMA Department of Research based on State Department of Finance data.
In California, the ratio increased from 157 to 166 (29,400 to 33,600) during the same period. The percentage increase for both United States and California ratios was about equal (both more than 5 percent). Significantly, in California patient care physicians increased more rapidly than all active physicians. During this period, patient care physicians have increased by 9 percent while those not in patient care have actually decreased.\textsuperscript{13} Approximately 91 percent of active U.S. nonfederal physicians and 92 percent of active California physicians are involved in patient care.\textsuperscript{14}

Interestingly, while total nonfederal physicians have been increasing at about 4 percent annually, active physicians have been increasing at a slower and slightly declining rate (3.8, 3.0, and 1.3 percent annually between 1969 and 1972). This appears to be primarily accounted for by increases in the number of unclassified physicians (i.e., those for whom no information is available), and therefore this apparent decline in active physicians may not be "real" if many unclassified physicians are in fact active. In 1970 the number of unclassified physicians was 25 and in 1972 it was 1247.

3. Growth in physician supply has largely resulted because of significant recent increases in U.S. medical school graduates. Although California produces a relatively small share of U.S. medical school graduates, this percentage has been increasing gradually in recent years.

U.S. medical school graduates have increased 30 percent between 1964 and 1972 or, on the average, about 4 percent annually (7336 in 1964 to 9551 in 1972) a much more rapid rate than population growth (slightly more than 1 percent annually). During the same period, California medical school graduates increased 70 percent (391 to 665) or, on the average, about 9 percent annually while California civilian population growth increased about 14 percent or less than 2 percent annually.

\textsuperscript{13}American Medical Association, \textit{Profile of Medical Practice}, 1973, Table 1, p. 9, and 1971, Table 1, p. 9.

\textsuperscript{14}Physicians are classified as active in patient care or in teaching, administration, or research.
Between 1950 and 1959, California produced 5 percent of the nation's medical school graduates. From 1960 through 1972 this percentage increased to 5.5 percent. From 1968 through 1972 it increased to 6.2 percent. And in 1972, California produced 6.9 percent of the nation's graduates.

4. Projections indicate that both U.S. and California medical school graduates will increase substantially between 1973 and 1980 at an approximately equal rate and one that is more rapid than projected population growth. U.S. medical school graduates will probably increase from 9881 in 1973 to 14,680 in 1980, or 49 percent (6.9 percent average annual increase), while California medical school graduates are projected to increase from 665 in 1973 to 962 in 1980 or 45 percent (6.4 percent average annual growth).16

5. California is unusually fortunate in having a large proportion of its medical school graduates remain to practice in the state.

Most physicians have tended to practice in a state other than the one they graduated from. In 1967, of all U.S. physicians, 57 percent were practicing in another state while 77 percent of California graduates were practicing in California; 73 percent of California's 1950-59 graduates were located in the state in 1967.17

In 1972, California graduated 665 medical students. Almost 90 percent (594) of that number were serving as interns in the United States on December 31, 1972 and 70 percent of those (419) were located in California. Moreover, 70 percent of the total number of California graduates serving as both interns and residents in the United States were located in California (1562 of 2225 total California graduated interns and residents serving as interns and residents in the United States, December 1972). This percentage was the same as of December 31,

15 Fein and Weber, Table 29, p. 148.
16 California Department of Finance, Audits Division, Program Review Branch, The Need for Graduates of California Medical Schools, September 1973, Tables 8 and 9, pp. 36, 37.
17 Fein, p. 149.
1971 (of the 2153 California graduates serving as interns and residents, 1510 remained in California in such positions). Only three other states retained 50 percent or more of their intern or resident graduates as of December 31, 1972: Alabama, 50 percent; Minnesota, 58 percent; and Texas, 57 percent).  

6. Despite California's success in retaining its own graduates, there are not enough to meet the demand for health services and California is heavily dependent on immigration from other states for the lion's share of its physician supply.

Sixty-four percent of physicians residing in California as of December 1967 were educated in other states or in Canada, 6.4 percent in foreign schools, and only 30 percent in California schools.

Between 1967 and 1972, California's annual growth in physician supply has equaled between 21 and 26 percent of the total number of annual medical school graduates in the United States.

7. A significant component of physician immigration to California consists of interns and residents who have taken their undergraduate medical education at a school outside California, which attracts substantially more interns and residents than its medical schools produce. Moreover, California's share of U.S. interns and residents has been gradually increasing.

In addition to retaining 70 percent of its own graduates who went on to serve as interns and residents as of December 31, 1971 and 1972, California attracted 18 percent of all residents and interns graduated from schools in the United States who located in a state other than the one from which they graduated. About 56 percent of all

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20 As of December 31, 1972, interns and residents comprised 14 percent of California physicians involved in patient care.
U.S. house officers received their M.D. degrees from another state (Table 2). Seventy percent of California house officers in December 1972 were trained in other states and Canada (3706 of a total of 5703). 21

Table 2

U.S. MEDICAL SCHOOL GRADUATES SERVING OUTSIDE THEIR STATE OF GRADUATION AS INTERNS AND RESIDENTS IN OTHER STATES OR CALIFORNIA:
DECEMBER 1971 AND DECEMBER 1972

<table>
<thead>
<tr>
<th>Year</th>
<th>Total U.S. Interns &amp; Residents (1)</th>
<th>U.S. Interns &amp; Residents in Calif. (3)</th>
<th>Percent (3) to (2)</th>
<th>Percent (2) to (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1971</td>
<td>34,525</td>
<td>3,648</td>
<td>18</td>
<td>59</td>
</tr>
<tr>
<td>1972</td>
<td>34,849</td>
<td>3,609</td>
<td>18</td>
<td>58</td>
</tr>
</tbody>
</table>


In 1972, California produced about 7 percent of the nation's medical school graduates and attracted almost 12 percent (1,293 of 11,163) of the nation's interns and over 10 percent (4704 of 44,858) of the nation's residents, as shown in Table 3.

Table 3
MEDICAL INTERNSHIPS IN THE UNITED STATES AND CALIFORNIA:
SELECTED YEARS, 1950-1972

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Offered</th>
<th>Percent of U.S.</th>
<th>Number Filled</th>
<th>Percent of U.S.</th>
<th>U.S. Graduates</th>
<th>Foreign Medical Graduates</th>
<th>Percent Filled of Total Offered</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Total</td>
<td>U.S.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>United States\textsuperscript{a} and Canada</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1950</td>
<td>9,370</td>
<td>7,030</td>
<td>6,308</td>
<td>722</td>
<td>75.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1955</td>
<td>11,616</td>
<td>9,603</td>
<td>7,744</td>
<td>1,859</td>
<td>82.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1960</td>
<td>12,547</td>
<td>9,115</td>
<td>7,362</td>
<td>1,753</td>
<td>72.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1965</td>
<td>12,954</td>
<td>9,670</td>
<td>7,309</td>
<td>2,361</td>
<td>74.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1967</td>
<td>13,761</td>
<td>10,419</td>
<td>7,506</td>
<td>2,913</td>
<td>75.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1971</td>
<td>15,422</td>
<td>12,066</td>
<td>8,120</td>
<td>3,946</td>
<td>78.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1972</td>
<td>13,650</td>
<td>11,163</td>
<td>7,239</td>
<td>3,924</td>
<td>82.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>California</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1950</td>
<td>897</td>
<td>787</td>
<td>11.1</td>
<td>na\textsuperscript{b}</td>
<td>na</td>
<td>87.7</td>
<td></td>
</tr>
<tr>
<td>1955</td>
<td>917</td>
<td>800</td>
<td>8.3</td>
<td>na</td>
<td>na</td>
<td>87.2</td>
<td></td>
</tr>
<tr>
<td>1960</td>
<td>1,020</td>
<td>884</td>
<td>9.7</td>
<td>na</td>
<td>na</td>
<td>86.7</td>
<td></td>
</tr>
<tr>
<td>1965</td>
<td>1,113</td>
<td>1,031</td>
<td>10.7</td>
<td>na</td>
<td>na</td>
<td>92.6</td>
<td></td>
</tr>
<tr>
<td>1967</td>
<td>1,192</td>
<td>1,051</td>
<td>10.1</td>
<td>1,017</td>
<td>34</td>
<td>1.16</td>
<td>88.2</td>
</tr>
<tr>
<td>1971</td>
<td>1,515</td>
<td>1,365</td>
<td>11.3</td>
<td>1,308</td>
<td>57</td>
<td>1.44</td>
<td>90.0</td>
</tr>
<tr>
<td>1972</td>
<td>1,466</td>
<td>1,293</td>
<td>11.6</td>
<td>1,242</td>
<td>51</td>
<td>1.3</td>
<td>88.0</td>
</tr>
</tbody>
</table>

\textsuperscript{a}Includes territories and possessions.
\textsuperscript{b}Not available.

As Table 3 shows, between 1967 and 1971, the internships filled in the United States increased by 16 percent (10,419 to 12,066). In California they increased by 30 percent (1,051 to 1,365).  

Between 1967 and 1972, California filled internships (as a percentage of the U.S. total) gradually increased from 10.1 to 11.6 percent. Table 4 shows that between 1967 and 1972 the total number of residencies filled in the United States increased by 34 percent (33,509 to 44,858) and in California by 54 percent (3051 to 4704). California in 1972 filled 10.5 percent (4,704 and 44,858) of U.S. residencies; in 1967 the percentage was 9.1 percent.  

8. Private medical school graduates are more likely to leave their state of graduation than those from public schools. California has attracted a large share of private medical school graduates.  

According to the AMA report on Medical School Alumni, a higher percentage of public school graduates (50.2 percent) than private school graduates (37 percent) have remained to practice in the state they graduated from. Clearly, public schools give preference to their own residents. Eighty-five percent of first-year enrollments in fall 1967 and fall 1968 at public schools were state residents as compared with 41 and 42 percent at private schools, which have traditionally accepted many out-of-state residents.  

In 1967, 7 percent of private medical school freshmen were from California; in the same year, California had 15.2 percent of all 1950-59 private school graduates. It was the state that had attracted the most private school graduates.

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22 In 1972, the total number of internships offered and filled was reduced both in the United States and California, but California's percentage of those filled in the United States increased over the previous year.


24 Fein and Weber, Table 34, p. 180.
### Table 4

MEDICAL RESIDENCIES IN THE UNITED STATES AND CALIFORNIA: SELECTED YEARS, 1950-1972

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Offered</th>
<th>Percent of U.S.</th>
<th>Number Filled</th>
<th>Percent of U.S.</th>
<th>U.S. Graduates</th>
<th>Foreign Medical Graduates</th>
<th>Percent of U.S.</th>
<th>Percent Filled of Total Offered</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>United States and Canada</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1950</td>
<td>19,364</td>
<td></td>
<td>14,495</td>
<td></td>
<td>13,145</td>
<td>1,350</td>
<td>74.9</td>
<td></td>
</tr>
<tr>
<td>1955</td>
<td>26,516</td>
<td></td>
<td>21,425</td>
<td></td>
<td>17,251</td>
<td>4,174</td>
<td>80.8</td>
<td></td>
</tr>
<tr>
<td>1960</td>
<td>32,786</td>
<td></td>
<td>28,447</td>
<td></td>
<td>20,265</td>
<td>8,182</td>
<td>86.8</td>
<td></td>
</tr>
<tr>
<td>1965</td>
<td>38,979</td>
<td></td>
<td>31,898</td>
<td></td>
<td>22,765</td>
<td>9,133</td>
<td>81.8</td>
<td></td>
</tr>
<tr>
<td>1967</td>
<td>41,173</td>
<td></td>
<td>35,509</td>
<td></td>
<td>22,904</td>
<td>10,605</td>
<td>81.0</td>
<td></td>
</tr>
<tr>
<td>1971</td>
<td>49,693</td>
<td></td>
<td>42,293</td>
<td></td>
<td>28,773</td>
<td>13,520</td>
<td>85.0</td>
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<td>1972</td>
<td>51,115</td>
<td></td>
<td>44,858</td>
<td></td>
<td>30,418</td>
<td>14,440</td>
<td>88.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>California</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1950</td>
<td>na</td>
<td></td>
<td>na</td>
<td></td>
<td>na</td>
<td>na</td>
<td>na</td>
<td></td>
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<tr>
<td>1955</td>
<td>na</td>
<td></td>
<td>na</td>
<td></td>
<td>na</td>
<td>na</td>
<td>na</td>
<td></td>
</tr>
<tr>
<td>1960</td>
<td>2,713</td>
<td>8.3</td>
<td>2,330</td>
<td>8.2</td>
<td>na</td>
<td>na</td>
<td>85.9</td>
<td></td>
</tr>
<tr>
<td>1965</td>
<td>3,487</td>
<td>8.5</td>
<td>2,957</td>
<td>9.3</td>
<td>na</td>
<td>na</td>
<td>84.8</td>
<td></td>
</tr>
<tr>
<td>1967</td>
<td>3,684</td>
<td>8.9</td>
<td>3,051</td>
<td>9.1</td>
<td>2,890</td>
<td>161</td>
<td>1.5</td>
<td>82.8</td>
</tr>
<tr>
<td>1971</td>
<td>4,705</td>
<td>9.5</td>
<td>4,183</td>
<td>9.9</td>
<td>3,919</td>
<td>264</td>
<td>1.9</td>
<td>89.0</td>
</tr>
<tr>
<td>1972</td>
<td>5,259</td>
<td>10.3</td>
<td>4,704</td>
<td>10.5</td>
<td>4,365</td>
<td>339</td>
<td>2.3</td>
<td>89.0</td>
</tr>
</tbody>
</table>


a Not available.
9. While the number of foreign medical school graduates (FMGs) in the United States has increased substantially in recent years, California has employed relatively few, and this number is decreasing.

In 1967, 6.4 percent of California physicians were foreign medical school graduates as compared with 15 percent for the nation. In 1970, this percentage decreased to 4.8 percent for California and increased to 17.1 percent for the nation, as shown in Table 5.

Table 5

<table>
<thead>
<tr>
<th>Date</th>
<th>Place</th>
<th>Number of Physicians</th>
<th>U.S. and Canada Graduates</th>
<th>Foreign Graduates</th>
<th>Percent of Total From Foreign Schools</th>
</tr>
</thead>
<tbody>
<tr>
<td>12/31/67</td>
<td>California</td>
<td>37,220</td>
<td>34,831</td>
<td>2,389</td>
<td>6.4</td>
</tr>
<tr>
<td></td>
<td>U.S.</td>
<td>309,644</td>
<td>263,082</td>
<td>46,347</td>
<td>15.0</td>
</tr>
<tr>
<td>12/31/70</td>
<td>California</td>
<td>41,640</td>
<td>38,660</td>
<td>1,980</td>
<td>4.8</td>
</tr>
<tr>
<td></td>
<td>U.S.</td>
<td>334,028</td>
<td>276,811</td>
<td>57,217</td>
<td>17.1</td>
</tr>
</tbody>
</table>


In 1970, substantial proportions of the physicians' supply in other states consisted of FMGs. (New York, 36 percent; Rhode Island and New Jersey, 30 percent each; Illinois and Delaware, 28 percent each; and Ohio, West Virginia, and Maryland, 24 percent each.)

In 1972, California licensed 129 FMGs as additions to the medical profession, only 1.9 percent of the nation's total (6661). New York licensed 17 percent; Pennsylvania, 14 percent; Michigan, 10 percent; Illinois, 9 percent; and Virginia, 8 percent.
Between 1967 and 1972, FMGs filled only between 1 and 2 percent of California internships and residencies. (During this period the number of FMG additions to the medical profession in the United States increased 220 percent from 2081 to 6661).

Indiana, Florida and California reported the highest failure rate for FMGs examined by state licensure boards in 1972 at 69.1, 52.4 and 51.4 percent, respectively.

**FUTURE TRENDS**

In general, these trends illustrate that California and the nation will probably experience increases in the number of physicians and in physician to population ratios through 1980, primarily due to projected increases in the number of medical school graduates. National enrollment increases have resulted largely from federal encouragement.

The Comprehensive Manpower Training Act of 1971 has had a substantial impact on the number of first year medical school places which between 1971-72 and 1977-78 will have increased by 25 percent. This program has had major benefits for California since many graduates from other states locate here. If federal funding for institutional grants is reduced and medical schools are required to maintain enrollments as a condition of receiving continued support, then both public and private schools will face the option of increasing tuition, obtaining larger State appropriations, or enlarging support generated by clinical faculty medical practice. Thus, a top state priority should be to review the anticipated impact of proposed federal policies on California medical schools and alternative state actions to either influence those policies or accommodate to them.\(^{25}\)

Other critical questions for California will be the extent to which physicians continue to migrate from other states and the extent to which California remains attractive to state medical school graduates.

The California Department of Finance has recently estimated physician immigration and projected California physicians' supply through 1990. They derived annual net immigration by measuring the annual net change in the number of nonfederal physicians, adjusting for death and retirement of the physician stock, and then subtracting California medical school graduates. 26 Utilizing this method, net annual immigration is estimated for 1964 through 1972, as shown in Table 6.

In a separate study, the Assembly Office of Research in 1973 prepared data on physician migration between 1961 and 1970 utilizing the State Board of Medical Examiners Directory and estimating migration based on place of medical school of new physicians. Their estimate shows physician immigration varied between 759 in 1963 to 1499 in 1970. During this same period the Department of Finance population research unit estimates that net total immigration to California declined substantially. (See Table 7.) Thus, despite significant decline in migration to California, physicians apparently are still being attracted to the state in significant numbers.

The Department of Finance analyzed net physician migration as a function of U.S. medical school graduates between 1964 and 1972, and found that it varied from 13 percent in 1966 to 21 percent in 1969, as shown in Table 6. California physician supply through 1990 was estimated assuming that 13 percent of projected U.S. medical school graduates will migrate to California (see Table 8).

26 This estimate appears conservative inasmuch as all California graduates are subtracted from the total, whereas not all these graduates remain in the state. In 1967, 77.4 percent of California graduates were practicing in the state.
Table 6

RELATIONSHIP BETWEEN NEW LICENTIATES IN U.S. MEDICAL SCHOOL GRADUATES IN U.S., AND NET M.D. IMMIGRATION TO CALIFORNIA, 1964-1972

<table>
<thead>
<tr>
<th>Year</th>
<th>New Licentiates in U.S. (1)</th>
<th>Medical School Graduates in U.S. (2)</th>
<th>Net M.D. Immigration to Calif. (3)</th>
<th>Percent (3) to (1)</th>
<th>Percent (3) to (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1964</td>
<td>7,911</td>
<td>7,336</td>
<td>1,269</td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td>1965</td>
<td>9,147</td>
<td>7,409</td>
<td>1,221</td>
<td>13</td>
<td>16</td>
</tr>
<tr>
<td>1966</td>
<td>8,851</td>
<td>7,574</td>
<td>1,015</td>
<td>12</td>
<td>13</td>
</tr>
<tr>
<td>1967</td>
<td>9,424</td>
<td>7,743</td>
<td>1,047</td>
<td>11</td>
<td>14</td>
</tr>
<tr>
<td>1968</td>
<td>9,766</td>
<td>7,973</td>
<td>1,229</td>
<td>13</td>
<td>15</td>
</tr>
<tr>
<td>1969</td>
<td>9,978</td>
<td>8,059</td>
<td>1,674</td>
<td>17</td>
<td>21</td>
</tr>
<tr>
<td>1970</td>
<td>11,032</td>
<td>8,367</td>
<td>1,492</td>
<td>14</td>
<td>18</td>
</tr>
<tr>
<td>1971</td>
<td>12,257</td>
<td>8,974</td>
<td>1,555</td>
<td>13</td>
<td>17</td>
</tr>
<tr>
<td>1972</td>
<td>14,476</td>
<td>9,551</td>
<td>1,665</td>
<td>12</td>
<td>17</td>
</tr>
</tbody>
</table>


(2) From Table 3.

(3) Annual net M.D. immigrants to California = net change in number of nonfederal M.D.'s in California less graduates of California medical schools, plus deaths. Deaths = 1.78 percent of number of physicians, which is the death rate of the U.S. white population applied by age cohort to the age distribution of California physicians.
Table 7
RELATIONSHIP BETWEEN M.D. IMMIGRATION AND TOTAL IMMIGRATION
TO CALIFORNIA, 1961-1972

<table>
<thead>
<tr>
<th>Year</th>
<th>M.D. Immigration to California</th>
<th>Civilian Migration$^b$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Assembly Research Office Estimate</td>
<td>Percent Change</td>
</tr>
<tr>
<td>1961</td>
<td>951</td>
<td>na$^c$</td>
</tr>
<tr>
<td>1963</td>
<td>759</td>
<td>1961-63</td>
</tr>
<tr>
<td>1964</td>
<td>1,269</td>
<td>1963-65</td>
</tr>
<tr>
<td>1965</td>
<td>878</td>
<td>1,221</td>
</tr>
<tr>
<td>1966</td>
<td>1,015</td>
<td>1965-67</td>
</tr>
<tr>
<td>1967</td>
<td>1,105</td>
<td>1,047</td>
</tr>
<tr>
<td>1968</td>
<td>1,229</td>
<td>1,147</td>
</tr>
<tr>
<td>1969</td>
<td>1,454</td>
<td>1,674</td>
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<tr>
<td>1970</td>
<td>1,499</td>
<td>1,492</td>
</tr>
<tr>
<td>1971</td>
<td>1,555</td>
<td>24,000</td>
</tr>
<tr>
<td>1972</td>
<td>1,665</td>
<td>24,000</td>
</tr>
</tbody>
</table>


$^c$Not available.
Table 8
PROJECTION OF NONFEDERAL M.D.'S IN CALIFORNIA AND
AND COMPONENTS OF CHANGE, 1970-1990

<table>
<thead>
<tr>
<th>Year</th>
<th>California Medical School Graduates</th>
<th>Net M.D. Immigration to California</th>
<th>Year-End Nonfederal M.D.'s</th>
<th>Annual Growth Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>488</td>
<td>1,492</td>
<td>38,031</td>
<td>↑</td>
</tr>
<tr>
<td>1971</td>
<td>545</td>
<td>1,555</td>
<td>39,435</td>
<td>↑</td>
</tr>
<tr>
<td>1972</td>
<td>665</td>
<td>1,665</td>
<td>41,043</td>
<td>↑</td>
</tr>
<tr>
<td>1973</td>
<td>665</td>
<td>1,284</td>
<td>42,227</td>
<td>↑</td>
</tr>
<tr>
<td>1974</td>
<td>706</td>
<td>1,402</td>
<td>43,546</td>
<td>↑</td>
</tr>
<tr>
<td>1975</td>
<td>770</td>
<td>1,527</td>
<td>45,027</td>
<td>3.5%</td>
</tr>
<tr>
<td>1976</td>
<td>838</td>
<td>1,646</td>
<td>46,665</td>
<td>↓</td>
</tr>
<tr>
<td>1977</td>
<td>846</td>
<td>1,757</td>
<td>48,391</td>
<td>3.2%</td>
</tr>
<tr>
<td>1978</td>
<td>854</td>
<td>1,778</td>
<td>50,115</td>
<td>↑</td>
</tr>
<tr>
<td>1979</td>
<td>911</td>
<td>1,880</td>
<td>51,964</td>
<td>↑</td>
</tr>
<tr>
<td>1980</td>
<td>962</td>
<td>1,908</td>
<td>53,858</td>
<td>↑</td>
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<tr>
<td>1981</td>
<td>962</td>
<td>1,976</td>
<td>55,785</td>
<td>↑</td>
</tr>
<tr>
<td>1982</td>
<td>962</td>
<td>1,976</td>
<td>57,678</td>
<td>↑</td>
</tr>
<tr>
<td>1983</td>
<td>962</td>
<td>1,976</td>
<td>59,537</td>
<td>↑</td>
</tr>
<tr>
<td>1984</td>
<td>962</td>
<td>1,976</td>
<td>61,363</td>
<td>↑</td>
</tr>
<tr>
<td>1985</td>
<td>962</td>
<td>1,976</td>
<td>63,156</td>
<td>↑</td>
</tr>
<tr>
<td>1986</td>
<td>962</td>
<td>1,976</td>
<td>64,918</td>
<td>3.0%</td>
</tr>
<tr>
<td>1987</td>
<td>962</td>
<td>1,976</td>
<td>66,648</td>
<td>↓</td>
</tr>
<tr>
<td>1988</td>
<td>962</td>
<td>1,976</td>
<td>68,347</td>
<td>↓</td>
</tr>
<tr>
<td>1989</td>
<td>962</td>
<td>1,976</td>
<td>70,016</td>
<td>↓</td>
</tr>
<tr>
<td>1990</td>
<td>962</td>
<td>1,976</td>
<td>71,655</td>
<td>↓</td>
</tr>
</tbody>
</table>


aEntering class sizes obtained by telephone from each of the three private medical colleges in California and from the office of the Special Assistant to the President, Health Affairs, University of California. Figures shown are 95 percent of entering class four years earlier. No increases are projected after 1976 entering class.

bFrom Table 9.

c1970-1972 from Table 2, which in turn is derived from the AMA's annual Profile of Medical Practice. 1973-1990 = previous year-end nonfederal M.D.'s, plus California medical school graduates, plus net immigration of M.D.'s, the total reduced by a death rate of 1.78 percent, which is the death rate of the U.S. white population applied by age cohort to the age distribution of California physicians. See Appendix II, The Need for Graduates of California Medical Schools.
This projection indicates nonfederal M.D.'s in California will increase at an annual rate of 3.5 percent between 1970 and 1980 and 3 percent between 1980 and 1990. Applying Department of Finance population projections, California will have about 212 physicians per 100,000 population by 1975 and 238 per 100,000 by 1980. This estimate is conservative (1) because the lowest percentage of net migration to total graduates is applied; (2) it assumes no increase in U.S. medical school graduates after 1981; and (3) immigration of foreign medical school graduates is excluded due to the uncertainty of supply from this source.\footnote{In 1972, California licensed 129 foreign medical graduates.} Moreover, between 1968 and 1972 the total number of physicians in California (active plus inactive or unclassified) increased by over 4 percent annually. If this increase continues, then California's supply would be greater than that projected by the Department of Finance. During this period (1968-1972), U.S. medical school graduates increased an average of 5 percent annually, and California graduates increased on the average of 6 percent annually. Between 1972 and 1980, U.S. medical school graduates are projected to increase by about 8 percent annually on the average and California grads by 9 percent. Thus one might be led to assume, based upon past trends, that California physician supply growth may be even greater than 4 percent annually.

A note of caution should be raised about the method employed to project physician supply. It assumes a fixed relationship in the future between net M.D. immigration to California and U.S. medical school graduates as a basis for projecting physician supply. This assumed coefficient masks the interaction of complex variables influencing physician location decisions, many of which are not well understood. Net change in physician supply depends not only on decisions of medical school graduates regarding where to do their internship and residency and the subsequent decisions concerning practice location, but also the flow of practicing physicians to and from California. Recent data-
are available on internships and residencies and are presented earlier; however, little is known about practice decisions of interns and residents after they complete their postgraduate education, and little is known about the flow of practicing physicians who migrate to and from California. The Committee on Goals and Priorities of the National Board of Medical Examiners makes two interesting projections: that in the future graduate and undergraduate programs will become more integrated, and that "opportunities will expand for students to remain in a single institution for all of their formal medical education."\(^{28}\) If this occurs, migration to California might be significantly reduced. In addition, most proposed forms of national health insurance would probably increase the demand for physician services. Thus, although the Department of Finance has been conservative in preparing its estimate, it is difficult to base long-range policy decisions governing the flow of physicians on an assumed fixed relationship composed of many complex variables that are little understood and that may change substantially in the future.

Clearly, a most sensitive factor is the extent to which new as well as practicing physicians will continue to migrate to California despite declines in total civilian migration. Other states are certainly not unaware of the fact that California is attracting many of their medical school graduates. In a recent article, Pierre de Vise wonders

> why Illinois views doubling of its medical schools and graduates in the next 10 years at a cost of perhaps half a billion dollars as anything less than a subsidy for California-bound physicians attracted by the lures of climate, glamour, and federal dollars.\(^{29}\)

\(^{28}\) National Board of Medical Examiners, *Report of the Committee on Goals and Priorities, "Evaluation in the Continuum of Medical Education,"* June 1973, p. 45.

We can anticipate that other states will attempt to take steps to make their states more attractive to physicians, but we can make no estimate of the potential success of these attempts.

It is also important to note that most new U.S. medical schools are public primarily because federal funds appear to have been insufficient to encourage the start of private medical schools. Only 5 of 23 schools either accredited since 1967-68 or under development in 1972-73 are private. Inasmuch as the public schools will give preference to state residents, they may cause more physicians to remain to practice in their states as opposed to private schools, which have traditionally accepted many out-of-state residents.\(^{30}\) Obviously, from California's standpoint, migration trends bear careful watching to determine any significant shift in migration patterns.

If California's physicians supply increases by 3 to 4 percent annually while population grows only slightly, will the state have too many or still too few physicians? Elia Ginzburg and others argue that because physicians can determine the demand for their own services, an increase in supply will cause them to deliver unnecessary care. He suggests that there are advantages to a "taut supply" that forces physicians to screen out "trivia" and "by and large devote their limited time to patients who have urgent problems or needs."\(^{31}\) Similarly, it might be argued that a taut supply may tend to increase the use of paraprofessionals, such as nurse practitioners and physician's assistants, as partial physical substitutes.

As Lynch points out, a key problem is that "there is no consensus on whether an increase in the number of physicians would lead either to lower fees or to a better geographic and social distribution of physicians."\(^{32}\)

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\(^{30}\) Koehler and Williams, p. 6.


SPECIALTY DISTRIBUTION

Since 1931 specialization was an established pattern in U.S. medical practice. In 1955, 77 percent of medical school graduates limited their practice to a specialty and only 17.7 percent were in general practice. By 1971, more than 80 percent of U.S. physicians reported that they were specialists. Specialization has caused increased concern about the declining number of primary care physicians. The AMA House of Delegates recently approved a report acknowledging general agreement on the need for more primary care physicians.\textsuperscript{33} The National Board of Medical Examiners' Committee on Goals and Priorities pointed out that

the increasing trend toward specialty and subspecialty practice has produced a highly developed and sophisticated system for secondary and tertiary medical care. Although this development was not intended to inhibit or supplant the production of primary care physicians, it has in fact done so. The number of primary care physicians has diminished steadily during the past three decades.\textsuperscript{34}

In 1971, approximately 20 percent of active nonfederal California physicians were in general or family practice (same as in the United States) and 45 percent were in primary care fields (48 percent in the United States). Between 1964 and 1971 the number of general or family practitioners in California declined by 14 percent (from 8023 to 6864); primary care physicians increased 5.5 percent (from 15,252 to 16,091), while the total number of active physicians increased by 24 percent (from 29,144 to 36,016) resulting in a general decline in the percentage of primary care to total physicians. Between 1964 and 1969 the physician population ratio for primary care physicians declined, but

\textsuperscript{33}In general, primary care physicians are those involved in general or family practice, internal medicine, pediatrics, obstetrics, and gynecology. For more discussion of this subject, see section on primary care alternatives.

\textsuperscript{34}National Board of Medical Examiners, p. 16.
during the last three years it has increased from 76.5 percent in 1969 to 80.1 percent in 1971. This was largely due to increases in the primary care specialties of internal medicine, pediatrics, and ob-gyn.

Are the present numbers of various specialists adequate to meet our health care needs? Our previous discussion and companion report describe the strengths and weaknesses of various methods used to estimate manpower requirements, noting that criteria derived from professionals are likely to be "high" and experience of prepaid groups are likely to be "low." Data compiled by the California Medical Association contain suggested criteria from both sources; the data are compared with current 1971 specialty distributions for California in Table 9. The results are quite interesting. For primary care, professional group standards indicate the need for more physicians of this type in California. The data from prepaid groups require a somewhat different analysis. Prepaid groups utilize fewer primary care physicians per person than suggested by professional groups or than are available in California or the nation. But they also employ fewer total numbers of physicians than these standards or current practice suggests so that the proportion of primary care to total physicians is in fact much higher than either professional criteria or prevailing current patterns of physician distribution. Adjusting for certain underreporting of specialty care and other factors, the

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36 In presenting these data, the CMA research staff notes that in some cases specialty trends are difficult to determine because of evolution in medical specialties that has resulted in reclassification of physicians in certain specialties and because of "a degree of artificiality in delineation between primary care and other types of physicians and a consequent inaccuracy in determining trends." California Medical Association, Socioeconomic Report, Vol. XIII, No. 3, March 1973, p. 3.
TABLE 9

Number of Persons Per Physician According to Specialty: Criteria or Existing Pattern; Existing Ratios in U.S. and California and Percent of Physicians Who Perceive the Existence of Shortages.

<table>
<thead>
<tr>
<th>Medical Specialty</th>
<th>Physician Staffing in Group Practice Setting</th>
<th>Suggested Criteria Representing &quot;Adequacy&quot;</th>
<th>Ratios: MDs in Patient Care Activities to Resident Civilian Population</th>
<th>Percent of Specialists Who Perceive Shortages in Their Specialty</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Group Practice 1</td>
<td>Group Practice 2</td>
<td>Group Practice 3</td>
<td>Medical Economics Magazine</td>
</tr>
<tr>
<td>Allergy</td>
<td>62,500</td>
<td>67,000</td>
<td></td>
<td>25,000</td>
</tr>
<tr>
<td>Anesthesiology</td>
<td>67,000</td>
<td>35,000</td>
<td>40,000</td>
<td>15,000</td>
</tr>
<tr>
<td>Cardiology</td>
<td>-</td>
<td>-</td>
<td></td>
<td>100,000</td>
</tr>
<tr>
<td>Dermatology</td>
<td>36,000</td>
<td>40,000</td>
<td>33,000</td>
<td>50,000</td>
</tr>
<tr>
<td>Family Practice</td>
<td>(6)</td>
<td>5,000</td>
<td>(6)</td>
<td>2,000</td>
</tr>
<tr>
<td>General Surgery</td>
<td>15,000</td>
<td>12,000</td>
<td>11,000</td>
<td>10,000</td>
</tr>
<tr>
<td>Internal Medicine</td>
<td>2,200</td>
<td>4,000</td>
<td>3,100</td>
<td>5,000</td>
</tr>
<tr>
<td>Neurology</td>
<td>100,000</td>
<td>100,000</td>
<td>200,000</td>
<td>75,000</td>
</tr>
<tr>
<td>Neurosurgery</td>
<td>-</td>
<td>100,000</td>
<td>100,000</td>
<td>100,000</td>
</tr>
<tr>
<td>Obstetrics-Gynecology</td>
<td>11,000</td>
<td>10,000</td>
<td>11,100</td>
<td>11,000</td>
</tr>
<tr>
<td>Ophthalmology</td>
<td>27,000</td>
<td>40,000</td>
<td>33,000</td>
<td>20,000</td>
</tr>
<tr>
<td>Orthopedic Surgery</td>
<td>31,000</td>
<td>28,000</td>
<td>25,000</td>
<td>30,000</td>
</tr>
<tr>
<td>Otolaryngology</td>
<td>22,000</td>
<td>45,000</td>
<td>33,000</td>
<td>25,000</td>
</tr>
<tr>
<td>Pathology</td>
<td>56,000</td>
<td>90,000</td>
<td>67,000</td>
<td>20,000</td>
</tr>
<tr>
<td>Pediatrics</td>
<td>5,600</td>
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<td>5,700</td>
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<tr>
<td>Physical Medicine</td>
<td>77,000</td>
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<td>-</td>
<td>-</td>
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<tr>
<td>Plastic Surgery</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>50,000</td>
</tr>
<tr>
<td>Psychiatry</td>
<td>36,000</td>
<td>67,000</td>
<td>10,000</td>
<td>14,300</td>
</tr>
<tr>
<td>Radiology</td>
<td>25,000</td>
<td>30,000</td>
<td>25,000</td>
<td>15,000</td>
</tr>
<tr>
<td>Thoracic Surgery</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>100,000</td>
</tr>
<tr>
<td>Urology</td>
<td>53,000</td>
<td>50,000</td>
<td>67,000</td>
<td>30,000</td>
</tr>
<tr>
<td>Primary Care</td>
<td>1,381</td>
<td>1,420</td>
<td>1,695</td>
<td>1,122</td>
</tr>
<tr>
<td>Specialty Care</td>
<td>2,695</td>
<td>3,549</td>
<td>2,775</td>
<td>1,508</td>
</tr>
<tr>
<td>Total</td>
<td>914</td>
<td>986</td>
<td>1,053</td>
<td>648</td>
</tr>
</tbody>
</table>

1 Pattern in 6 prepaid group practices quoted by Knowles
2 Pattern in 6 prepaid group practices quoted by Millon
3 Pattern Northern California Region, Permanente Medical Group (1970)
4 Survey conducted by Medical Economics
5 Survey conducted by AMA
6 Family Practice figures not shown separately, but are included in Internal Medicine category
7 Also includes Child Psychiatry
8 Also includes Diagnostic Radiology, Therapeutic Radiology
9 Includes Family Practice, Internal Medicine, Pediatrics and Obstetrics-Gynecology
10 Also includes specialties not individually listed

University of California estimates that prepaid plans had 65 percent of their physicians producing primary care as compared with 45 and 48 percent, respectively, for California and the United States.\textsuperscript{37}

As we pointed out earlier, these data must be interpreted with caution because prepaid groups that treat selected populations, most of whom are active, employed and "middle class," and many of whom utilize care outside the system.

A study by Schonfeld, based upon clinical judgments of pediatricians and internists in private practice serving on the Yale-New Haven Medical Center faculty, concluded that the supply of primary care physicians is about half what it should be.\textsuperscript{38}

Accepting the limitations of both professional criteria and the use of prepaid plans as a standard, these gross measures suggest the need to increase the proportion of primary care to total physicians.

Based upon professional criteria, California falls most short of family practitioners and allergists, and slightly short of pediatricians and thoracic surgeons. To bring family practitioners up to "ideal," 3000 more would be required. Although professional criteria suggest a major shortage of plastic surgeons, none are used in prepaid groups, and plastic surgeons themselves do not agree that there is a shortage. Based on these same criteria, however, California now has too many orthopedic surgeons, cardiologists, dermatologists, and psychiatrists. (Psychiatrists perceive a shortfall in their profession.)

\textsuperscript{37} The six prepaid plans referred to are Group Health Associates, Washington, D.C.; Health Plan of Pudget Sound; Health Insurance Plan of Greater New York; Kaiser Permanente Plans of Portland, Los Angeles, and Oakland. These plans utilize certain specialists apparently not reported separately and refer some patients, probably very few, for subspecialty care. They also utilize pathologists to a lesser extent than some other plans and private care. This is because they employ microbiologists and chemists, whereas state and federal laws require all hospitals to have laboratories, which results in more extensive use of pathologists than in prepaid plans. Prepaid plans with large centralized hospitals also conserve on radiologists as compared with the state or nation, which provide more decentralized care. See, University of California, Office of the President, A Report to the Legislature on a Plan for Meeting the State's Needs for Primary Care Services and Physicians, Berkeley, January 1974, pp. 7-14.

GEOGRAPHIC DISTRIBUTION

Even if the United States or a particular state produces an adequate physician supply (leaving aside for the moment the lack of consensus about what is adequate), the more important question is how medical services are distributed so that citizens have reasonable access to them. Many have described a serious geographic maldistribution of physician services by region, across states, and within states among urban, rural, suburban, and inner city areas. For example, in 1971 physician population ratios ranged from 344 per 100,000 (physicians in patient care) in Washington, D.C., to 75 per 100,000 in Mississippi. In 1970, the patient care physician population ratios ranged from 42 to 88 in nonmetropolitan areas of the United States and from 95 to 195 in metropolitan areas.

The 1971 active physician population ratio in major California metropolitan areas was 194.5 as compared with 88.2 in isolated rural areas. With counties, ratios varied from 0, 43 and 45 in Alpine, San Benito, and Glenn, to 513, 281 and 255 in San Francisco, Marin, and Napa.

As Table 10 shows, between December 1963 and December 1971, California's active physician population ratio increased 12.7 percent. All geographic areas of the state showed some ratio growth during this period—with the largest increase in isolated rural areas (20.7 percent) and the smallest in isolated semirural areas (7.6 percent).

When the data are grouped by metropolitan areas in Table 11, other patterns emerge. San Francisco-Oakland, the area with the largest 1963 ratio of active physicians to population ratio (211.5), had an 18.9-percent increase to further jump its ratio to 251.4. Thus the Bay Area, with an already large supply, continues to attract more physicians. The most dramatic increases were in Sacramento, 42.6 percent; San Diego, 36.7 percent; Santa Barbara, 21.8 percent; the Northern Coast, 20.9 percent; and Anaheim, 18.2 percent. Interestingly, new medical schools were opened during this period in three of these areas (U.C. Davis in Sacramento, U.C. San Diego, and U.C. Irvine in Anaheim), which suggests that school location contributed to the increase over and above growth due to physicians on staff.
Table 10
NUMBER OF ACTIVE NONFEDERAL PHYSICIANS, TOTAL POPULATION AND PHYSICIAN/POPULATION RATIOS BY TYPE OF AREA, CALIFORNIA, DECEMBER 1963 AND DECEMBER 1971

<table>
<thead>
<tr>
<th>Type of Area</th>
<th>December 1963</th>
<th>December 1971</th>
<th>Percent Increase in Physicians</th>
<th>Percent Increase in Ratios</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Physicians</td>
<td>Population (000)</td>
<td>Ratio</td>
<td>Physicians</td>
</tr>
<tr>
<td>Major Metropolitan</td>
<td>23,182</td>
<td>13,428.6</td>
<td>172.6</td>
<td>29,920</td>
</tr>
<tr>
<td>Other Metropolitan</td>
<td>3,561</td>
<td>2,983.1</td>
<td>119.4</td>
<td>4,803</td>
</tr>
<tr>
<td>Counties Adjacent to Metropolitan Areas</td>
<td>666</td>
<td>693.2</td>
<td>96.1</td>
<td>819</td>
</tr>
<tr>
<td>Isolated Semi-Rural</td>
<td>591</td>
<td>564.8</td>
<td>104.6</td>
<td>686</td>
</tr>
<tr>
<td>Isolated Rural</td>
<td>73</td>
<td>99.8</td>
<td>73.1</td>
<td>101</td>
</tr>
<tr>
<td>State Total</td>
<td>28,073</td>
<td>17,769.5</td>
<td>158.0</td>
<td>36,392</td>
</tr>
</tbody>
</table>

1 Counties included in each classification:
Major Metropolitan: Alameda, Contra Costa, Los Angeles, Marin, Orange, San Diego, San Francisco, Santa Barbara, Santa Cruz, Solano, Solano, Sonoma, Stanislaus, Ventura, Yolo.
Other Metropolitan: Fresno, Kern, Sacramento, San Joaquin, San Luis Obispo, Santa Cruz, Sutter, Tulare, Yuma.
Isolated Semi-rural: Butte, Colusa, Glenn, Humboldt, Imperial, Mendocino, Nevada, Shasta, Siskiyou, Tehama, Tuolumne, Yuba.
Isolated Rural: Del Norte, Inyo, Lassen, Modoc, Alpine, Lake, Mariposa, Mono, Plumas, Sierra, Trinity.

### Table 11

RATIOS OF ACTIVE NONFEDERAL PHYSICIANS TO TOTAL POPULATION, BY STANDARD METROPOLITAN STATISTICAL AREA AND NON-METROPOLITAN AREAS, CALIFORNIA, DECEMBER 1963 AND DECEMBER 1971

<table>
<thead>
<tr>
<th>Area 1</th>
<th>Physicians per 100,000 persons</th>
<th>Percent Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>December 1963</td>
<td>December 1971</td>
</tr>
<tr>
<td>Standard Metropolitan Statistical Areas:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>San Francisco/Oakland</td>
<td>211.5</td>
<td>251.4</td>
</tr>
<tr>
<td>San Jose</td>
<td>198.1</td>
<td>209.9</td>
</tr>
<tr>
<td>Stockton</td>
<td>114.7</td>
<td>163.6</td>
</tr>
<tr>
<td>Modesto</td>
<td>127.7</td>
<td>123.3</td>
</tr>
<tr>
<td>Fresno</td>
<td>118.0</td>
<td>116.7</td>
</tr>
<tr>
<td>Los Angeles/Long Beach</td>
<td>113.7</td>
<td>125.3</td>
</tr>
<tr>
<td>San Diego</td>
<td>124.8</td>
<td>170.6</td>
</tr>
<tr>
<td>San Bernardino/Riverside/ Ontario</td>
<td>113.9</td>
<td>132.3</td>
</tr>
<tr>
<td>Bakersfield</td>
<td>103.6</td>
<td>99.0</td>
</tr>
<tr>
<td>Santa Barbara</td>
<td>150.5</td>
<td>182.0</td>
</tr>
<tr>
<td>Anaheim/Santa Ana/ Garden Grove</td>
<td>115.5</td>
<td>135.5</td>
</tr>
<tr>
<td>Vallejo/Napa</td>
<td>135.7</td>
<td>139.0</td>
</tr>
<tr>
<td>Ventura/Oxnard</td>
<td>107.2</td>
<td>122.4</td>
</tr>
<tr>
<td>Salinas/Monterey</td>
<td>103.0</td>
<td>117.6</td>
</tr>
<tr>
<td>Santa Rosa</td>
<td>145.9</td>
<td>144.6</td>
</tr>
<tr>
<td>Non Metropolitan Areas:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northern Coast</td>
<td>105.8</td>
<td>127.9</td>
</tr>
<tr>
<td>South Central Coast</td>
<td>137.7</td>
<td>146.2</td>
</tr>
<tr>
<td>Sacramento Valley</td>
<td>101.1</td>
<td>102.6</td>
</tr>
<tr>
<td>San Joaquin Valley</td>
<td>78.3</td>
<td>80.5</td>
</tr>
<tr>
<td>Imperial Valley</td>
<td>74.5</td>
<td>66.2</td>
</tr>
<tr>
<td>Sierra</td>
<td>93.0</td>
<td>107.6</td>
</tr>
</tbody>
</table>


Also interesting are high growth rates and/or relatively high ratios in physically attractive areas like Santa Barbara, the North Coast, and the Sierra's. Only four areas registered declines during this period, the most dramatic one occurring in the Imperial Valley. It had the lowest ratio of any area in the state in 1963 and dropped substantially lower in 1971 (74.5 to 66.2, an 11.1 percent drop). Bakersfield also suffered a reduction from its already low 103.6 ratio to 99 percent, a 4.4 percent reduction. Two other areas showing modest declines were Stockton (-3.4) and Santa Rosa (-0.9). Another area with a very low ratio was the San Joaquin Valley. Despite a modest ratio increase, 2.8 percent, its 1971 ratio was 80.5 percent.

Thus, while all of the state's geographic areas showed some ratio increase between 1963 and 1971, with the greatest ratio growth in isolated rural areas, these rural areas have half as many physicians per capita as major metropolitan areas. Despite these disparities, it would be inaccurate to assume that all physicians should be distributed on an equal basis around the state. Clearly some specialists who require a large population base to support an active practice should not locate in a sparsely populated area. It can be argued, however, that primary care physicians should be more equally distributed.

The California Medical Association has compiled data on specialty distribution by geographic area for July 1969. While these data group certain primary and nonprimary care specialties, they do provide a general approximation of primary care distribution in California. Table 12 shows physician population ratios for these predominantly primary care groupings as follows: Greater metropolitan area 94.9; lesser metropolitan area 72.2; adjacent to metropolitan areas 67.3; isolated semirural 66.2; isolated rural 66.7. These physicians represented a higher percentage of all doctors in nonmetropolitan areas. The distribution of primary care physicians is actually more equitable than these data show because specialists included with internal medicine and pediatrics (e.g., pulmonary disease, gastroenterology, allergy, cardiovascular disease, pediatric cardiology,
Table 12

NUMBER AND RATIO PER 100,000 POPULATION OF ACTIVE NONFEDERAL PHYSICIANS BY TYPE OF GEOGRAPHICAL AREA and MEDICAL SPECIALTY (PREDOMINANTLY PRIMARY CARE): CALIFORNIA, JULY 1969

<table>
<thead>
<tr>
<th>Specialty</th>
<th>Greater Metropolitan</th>
<th>Lesser Metropolitan</th>
<th>Adjacent</th>
<th>Isolated Semirural</th>
<th>Isolated Rural</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal Medicine, Pulmonary Diseases, Gastroenterology, Allergy, Cardiovascular Disease</td>
<td>3,666</td>
<td>1,279</td>
<td>133</td>
<td>40</td>
<td>-</td>
<td>5,118</td>
</tr>
<tr>
<td>Pediatrics, Pediatric Allergy, Pediatric Cardiology</td>
<td>1,402</td>
<td>575</td>
<td>55</td>
<td>8</td>
<td>-</td>
<td>2,040</td>
</tr>
<tr>
<td>Obstetrics and Gynecology</td>
<td>1,302</td>
<td>600</td>
<td>69</td>
<td>20</td>
<td>-</td>
<td>1,991</td>
</tr>
<tr>
<td>General Practice</td>
<td>4,641</td>
<td>2,231</td>
<td>640</td>
<td>263</td>
<td>15</td>
<td>7,790</td>
</tr>
<tr>
<td>Total Primary Care</td>
<td>11,011</td>
<td>4,685</td>
<td>897</td>
<td>331</td>
<td>66.7</td>
<td>16,939</td>
</tr>
<tr>
<td>Total All Physicians</td>
<td>21,977</td>
<td>9,171</td>
<td>1,466</td>
<td>561</td>
<td>17</td>
<td>33,192</td>
</tr>
<tr>
<td>Primary Care % of Total</td>
<td>50.1</td>
<td>51.1</td>
<td>61</td>
<td>59</td>
<td>88</td>
<td>51</td>
</tr>
<tr>
<td>General Practice % of Total</td>
<td>21</td>
<td>24</td>
<td>44</td>
<td>47</td>
<td>88</td>
<td>23.5</td>
</tr>
</tbody>
</table>


a Counties included in geographical areas:
Adjacent: Amador, Calaveras, Colusa, Eldorado, Imperial, Kings, Lake, Madera, Merced, Monterey, Nevada, San Benito, San Luis Obispo, Santa Cruz, Sonoma, Stanislaus, Sutter, Tulare, Ventura, Yuba.
Isolated semirural: Butte, Del Norte, Glenn, Humboldt, Inyo, Lassen, Mendocino, Modoc, Plumas, Shasta, Siskiyou.
Isolated rural: Alpine, Mariposa, Mono, Sierra, Trinity.

b As described in the text, CMA data group certain other specialties with internal medicine and pediatrics. Therefore, the number of primary care physicians in this table is overstated.
and pediatric allergy) are mostly located in metropolitan areas. Physician population ratios for general practitioners were higher in metropolitan areas, and GP's (as a percentage of all physicians) were considerably higher.

If these data are examined by economic areas, the mean ratio of physicians in primary care is 73 per 100,000 population for Standard Metropolitan Statistical Areas (SMSAs) and 66 for nonmetropolitan areas. The mean ratio for general practitioners is 35 for SMSAs and 48.5 for nonmetropolitan areas. Metropolitan areas with the lowest primary care physician population ratio were Bakersfield, Oxnard-Ventura, Salinas-Monterey, and Stockton (50.6, 58.9, 59.1, and 60.6 percent, respectively). The lowest nonmetropolitan counties were Imperial, South San Joaquin and North San Joaquin Valleys (44, 61.8 and 62.3 percent, respectively).

In 1971, six counties (Alameda, Los Angeles, Orange, San Diego, San Francisco, and Santa Clara) accounted for 69.3 percent of California's primary care physicians and 71.2 percent of all patient care physicians, and had 63.5 percent of the state's 1970 population, a more recent indication of the relatively more even distribution of primary care specialists. 1971 data also reveal, however, that urban counties (San Francisco, Marin, Napa, Alameda, Los Angeles, and Santa Clara) ranked high in availability of both specialty and primary care (see Table 13). Although some rural counties ranked in the top ten based upon primary care physician population ratios, they ranked low in total physician ratios (Mariposa, Nevada, Plumas, and Amador), while the ten lowest ratio counties for primary care were also low in total physicians. Thus, distribution of primary care physicians appears somewhat more equitable than that of all patient care physicians. Viewed from this perspective, urban-rural geographic disparities appear less pronounced, particularly for communities adjacent to metropolitan areas or within reasonable distance from population centers.

Overall trends in physician specialty and locational distribution indicate that disparities have continued despite total growth of state physician supply and recent growth in isolated rural areas. Major
Table 13
RANK ORDER COMPARISON OF COUNTIES BY RATIO OF PRIMARY HEALTH CARE
AND TOTAL PHYSICIANS TO TOTAL POPULATION:
CALIFORNIA, 1971

<table>
<thead>
<tr>
<th>County</th>
<th>Primary Health Care Physicians&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Total Physicians&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>Ratio&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>10 Highest Ratio Counties</td>
<td></td>
<td></td>
</tr>
<tr>
<td>San Francisco</td>
<td>1,320</td>
<td>184.4</td>
</tr>
<tr>
<td>Marin</td>
<td>232</td>
<td>112.6</td>
</tr>
<tr>
<td>Mariposa</td>
<td>6</td>
<td>99.8</td>
</tr>
<tr>
<td>Napa</td>
<td>77</td>
<td>97.3</td>
</tr>
<tr>
<td>Alameda</td>
<td>969</td>
<td>90.3</td>
</tr>
<tr>
<td>Nevada</td>
<td>23</td>
<td>87.3</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>6,070</td>
<td>86.3</td>
</tr>
<tr>
<td>Plumas</td>
<td>10</td>
<td>85.4</td>
</tr>
<tr>
<td>Santa Clara</td>
<td>904</td>
<td>84.9</td>
</tr>
<tr>
<td>Amador</td>
<td>10</td>
<td>84.6</td>
</tr>
<tr>
<td>10 Lowest Ratio Counties</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modoc</td>
<td>4</td>
<td>53.6</td>
</tr>
<tr>
<td>Kern</td>
<td>172</td>
<td>52.3</td>
</tr>
<tr>
<td>Mono</td>
<td>2</td>
<td>49.8</td>
</tr>
<tr>
<td>Sutter</td>
<td>20</td>
<td>47.7</td>
</tr>
<tr>
<td>San Benito</td>
<td>8</td>
<td>43.9</td>
</tr>
<tr>
<td>Merced</td>
<td>44</td>
<td>42.0</td>
</tr>
<tr>
<td>Glenn</td>
<td>7</td>
<td>40.0</td>
</tr>
<tr>
<td>Inyo</td>
<td>6</td>
<td>38.5</td>
</tr>
<tr>
<td>Imperial</td>
<td>26</td>
<td>34.9</td>
</tr>
<tr>
<td>Del Norte</td>
<td>5</td>
<td>34.3</td>
</tr>
</tbody>
</table>

Total California | 16,420 | 82.3 | -- | 36,070 | 180.8 | -- |


<sup>a</sup> Includes federal and nonfederal physicians in active patient care. Primary care physicians are those involved in general practice, internal medicine, and pediatrics.

<sup>b</sup> Number of physicians per 100,000 population.

<sup>c</sup> Excludes Alpine County, which has no physician.
metropolitan areas have much higher primary care physician population ratios than other areas of the state, even though primary care physicians are more equitably distributed than all physicians. Particular areas of the state, namely Bakersfield and the Imperial and San Joaquin Valleys, appear to have the greatest physician supply deficiency because of comparatively low total active physician population ratios, low primary care physician population ratios in 1969, and ratio reductions during the 1963-71 period. (San Joaquin had only a slight ratio increase.) These trends raise questions about the extent to which increases in future aggregate supply will significantly improve distribution.

Because utilizing ratios to assess distributional adequacy imposes certain limitations, more work should be done to define "medical service areas" based upon urban and rural demographic differences, the availability of different types of care, and access to it.

**PRIMARY CARE ALTERNATIVES**

There appears to be no consensus in the literature regarding an appropriate definition of primary care or primary care physician. For our purposes, primary care can be defined as the provision of comprehensive medical care to individuals and families. The primary care physician is one who provides or manages such care for a range of patients usually suffering from relatively uncomplicated medical problems. He may call upon specialists for consultation or may transfer responsibility or care to a specialist for unusually complicated problems.⁵⁹

If one of California's major concerns is improving the supply of primary care services, an important question is "What are alternative methods for delivering primary care?" and "What are their manpower policy implications"? We have reviewed the literature concerning primary care delivery systems and examined some of the tradeoffs and

---

constraints involved in expanding utilization of systems to deliver such care. The following discussion depends heavily on that work.

If a state desires to improve primary care services to priority areas of need in rural and inner city areas, increasing the aggregate supply of physicians by expanding undergraduate medical education is not the most cost-effective way of doing so because of the expense and time involved in training and because physicians generally tend to locate elsewhere. Moreover, available evidence on rural loan forgiveness and preceptorship programs indicates that they have not been too successful either in attracting many participants or in promoting rural practice. Inasmuch as rural background appears to be the most significant determinant of rural practice, it is most difficult to determine the extent to which those who receive governmental benefits would locate in rural areas anyway without the financial inducements.

A variant on the solo practitioner method of primary care delivery would utilize transportation and communication methods more extensively to extend physician services. Potential improvements in communication involve computer assisted diagnosis or other linkages with academic health centers including use of television. Transportation options include busing chronically ill patients and using helicopters to either bring patients to doctors or vice versa. A major problem with many of these methods is cost-effectiveness and failure to provide either continuity of care or preventive medicine. A reasonable approach would be to have a physician working in, for example, a centrally located clinic in a rural area so that he is accessible to those who need care and also is linked to more extensive medical capabilities by more traditional communication or transportation means, e.g., telephone and freeways.

A most promising approach for extending primary care medical services, particularly in rural areas, appears to be expanded use of paramedical personnel such as nurse practitioners and physician's assistants (PAs) who receive medical training to perform certain medical tasks under physician supervision. Several studies have concluded that utilizing a PA can potentially increase physician
output by 40 to 70 percent. However, little empirical evidence exists for evaluating the value of paramedical assistants. Sparse empirical studies indicate that the actual increase in physician output (as measured by office visits) due to PA use may be less than the 40 to 70 percent predicted by theoretical models. These results may be due to two factors: the relative newness of the programs; and many physicians, particularly in rural areas, desire PAs to help reduce their workload. Despite a decrease in productivity measured by office visits, utilization of PAs may help retain physicians in rural settings. It is therefore difficult to assess the value of PA utilization on the basis of number of office visits alone. Some studies of extended role nursing show promising results. Pediatric nurse practitioners have been shown to possess a high degree of competence in diagnosis, and use of nurse midwives coincided with increased prenatal care and decrease in prematurity and neonatal mortality at California's Madera County Hospital. Patient acceptance of paramedics appears good. Clearly, additional experimentation and evaluation of the costs and benefits of paramedic utilization is desirable. If paramedic utilization is to be assessed adequately, however, then licensure law practice constraints for experimental programs must be removed.

For urban areas, various group practice methods, including clinics, potentially are able to deliver more comprehensive and accessible care than that provided by solo practitioners. However, a major drawback of fee-for-service groups appears to be their relative inefficiency, whereas prepaid group practices appear to discourage necessary utilization and promote health maintenance, thereby providing care on a more cost-effective basis.

Unfortunately, systematic assessment of the relative costs and benefits of different primary care systems is lacking. For rural areas, it appears that investment in training programs for persons with rural backgrounds may improve physician distribution. Moreover, supporting rural physicians with paramedics, linkages to academic health centers, and close proximity to central locations may be the most effective method of providing primary care to these areas.
III. SUPPLY AND DISTRIBUTION OF NURSES

The nursing supply in California consists of registered nurses, vocational nurses, nurses' aides, orderlies, and attendants. Registered nurses are generally responsible for nursing care, carrying out physicians' instructions, and supervising vocational nurses and other nonprofessionals who perform routine patient care duties. Vocational nurses also care for and treat patients under the supervision of a physician or a registered nurse and may also supervise nonprofessionals. Aides, usually women, assist nurses in less skilled tasks, whereas orderlies and attendants, usually men, assist with male patients and carry out various heavy duties, particularly for the physically handicapped, mentally ill, and retarded. Tasks that nursing personnel perform overlap considerably. The State Health Department is now undertaking a study of the characteristics and tasks of registered nurses in California which should be useful to policymakers and analysts alike. 40 Here we describe current trends based upon available data.

AGGREGATE SUPPLY

Eight pertinent points apply to California's aggregate supply of nurses.

1. The supply of registered nurses (RNs) has increased substantially in recent years while that of licensed vocational nurses (LVNs) has grown even more rapidly.

As Table 14 indicates, total registered nurses residing in California increased by 54 percent between 1961 and 1973. During the same period the number of vocational nurse registrants almost tripled,

40 The aim of the Health Department Study is to delineate the tasks performed by various categories of health manpower. The first phase of the Functional Task Analysis Study will produce data on the characteristics of California's registered nurses. Specifically, information will be collected not only on age, location, activity and education, but also on the specific tasks that nurses perform. Reports describing the results of this work should be available sometime late in 1975.
growing from 15,980 to 48,500 (Table 15). In 1965, 1972, and 1973 about 90 percent of LVN registrants were located in California. In 1961, there were about 6 California RNs for every LVN; in 1973, there were about 3.

Table 14
TOTAL REGISTERED NURSES WITH CALIFORNIA ADDRESSES: 1961-1973, SELECTED YEARS

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of Nurses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1961</td>
<td>81,778</td>
</tr>
<tr>
<td>1965</td>
<td>98,438</td>
</tr>
<tr>
<td>1967</td>
<td>105,887</td>
</tr>
<tr>
<td>1968</td>
<td>109,936</td>
</tr>
<tr>
<td>1970</td>
<td>113,811</td>
</tr>
<tr>
<td>1973</td>
<td>126,637</td>
</tr>
</tbody>
</table>

SOURCE: Board of Nurse Education and Nurse Registration.

2. Nurse registrants are not an accurate indicator of nurse activity because many nurses do not work or work only part time. LVNs appear to have higher labor force participation than RNs.

Two critical elements affecting nursing supply are labor force participation rate and the extent of part-time versus full-time employment. Bayer compared the labor reserve in nursing with other professions noting that in 1960, 55 percent of active female professional nurses who were employed in the United States during the previous decade were no longer working as compared with 48 percent for social welfare and 36 percent for secondary education. He pointed out that if, through improvement in working conditions, the nurse labor reserve was reduced to that of teachers, a third of former professional nurses
Table 15
TOTAL LVN, LICENSEES, ACTIVE LVN'S, AND RATIO TO POPULATION:
1961-1973

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
<th>Total LVN's</th>
<th>Ratio per 100,000 Population</th>
<th>Active LVN's</th>
<th>Ratio per 100,000 Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>1961</td>
<td>16,369,000</td>
<td>15,980</td>
<td>97.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1962</td>
<td>16,912,000</td>
<td>17,115</td>
<td>101.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1963</td>
<td>17,333,000</td>
<td>19,428</td>
<td>110.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1964</td>
<td>18,041,000</td>
<td>20,004</td>
<td>110.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1965</td>
<td>18,516,000</td>
<td>22,740</td>
<td>122.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1966</td>
<td>18,879,000</td>
<td>24,505</td>
<td>129.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1967</td>
<td>19,261,000</td>
<td>28,480</td>
<td>147.9</td>
<td>21,844</td>
<td>113.4</td>
</tr>
<tr>
<td>1968</td>
<td>19,554,000</td>
<td>31,554</td>
<td>161.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1969</td>
<td>19,819,000</td>
<td>36,099</td>
<td>182.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1970</td>
<td>20,022,000</td>
<td>38,710</td>
<td>193.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1971</td>
<td>20,265,000</td>
<td>44,250</td>
<td>218.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1972</td>
<td>20,524,000</td>
<td>45,689</td>
<td>222.6</td>
<td>35,180</td>
<td>171.4</td>
</tr>
<tr>
<td>1973</td>
<td>20,761,000</td>
<td>48,500&lt;sup&gt;a&lt;/sup&gt;</td>
<td>233.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1974</td>
<td>21,048,000</td>
<td>52,500&lt;sup&gt;a&lt;/sup&gt;</td>
<td>249.4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SOURCE: Health Manpower Council of California, Licensed Vocational Nurses, Orinda, California, 1970, p. 9, updated after 1968 with data from Board of Vocational Nurse and Psychiatric Technician Examiners, and population estimates of the California Department of Finance. Estimates are for July 1 of each year.

<sup>a</sup>Estimated.
would be back in the labor force, "representing a potential expansion of about three times the then current output from nursing schools."  
[Emphasis added.]  

Between 1965 and 1970 it is estimated that from 65 to 69 percent of registered nurses in California were actively employed (see Table 16) and from 71 to 74 percent of active registered nurses were employed full time (see Table 17).  

A July 1972 survey by the Board of Vocational Nurse Examiners showed that 77 percent of LVNs residing in California were active; and of those active, 77 percent were working full time. A 1967 national survey also estimated that 77 percent of California's LVNs were actively employed.  

Thus, LVN labor force participation appears higher than RN participation.  

3. The nurse to population ratio of active RNs and LVNs has been increasing; 1970 standards set by the 1963 Report of the Surgeon General's Consultant Group on Nursing have been met.  

Between 1967 and 1973, estimated active nurse to population ratios for RNs increased 8 percent (from 366 to 396 per 100,000 population) and for LVNs 51 percent (from 113 to 171).  

In 1963, the Surgeon General's Consultant Group on Nursing in the U.S. Public Health Service found a national need for approximately 850,000 RNs and 350,000 LVNs by 1970 and suggested a standard of 350 active RNs and 163 LVNs per 100,000. In California, this standard was reached in the 1960s for RNs and in 1971 for LVNs. Interestingly, the standards of need were considered unrealistically high and more feasible 1970 goals were set (e.g., 650,000 RNs by 1970).  

In 1970, California

---


43 Health Manpower Council of California, Registered Nurses, December 1970, p. 7. We discussed the limitations of such standards earlier.
Table 16

ACTIVE REGISTERED NURSE POPULATION RATIOS IN CALIFORNIA:

<table>
<thead>
<tr>
<th>Year</th>
<th>Total California RN's</th>
<th>Active RN's</th>
<th>Active Percent or Total</th>
<th>Ratio per 100,000 Population b</th>
</tr>
</thead>
<tbody>
<tr>
<td>1965</td>
<td>98,438</td>
<td>68,127</td>
<td>69</td>
<td>368</td>
</tr>
<tr>
<td>1967</td>
<td>105,887</td>
<td>70,495</td>
<td>66</td>
<td>366</td>
</tr>
<tr>
<td>1968a</td>
<td>109,936</td>
<td>71,596</td>
<td>65</td>
<td>366</td>
</tr>
<tr>
<td>1970a</td>
<td>113,811</td>
<td>77,391</td>
<td>68</td>
<td>386</td>
</tr>
<tr>
<td>1973 estimate a</td>
<td>126,637</td>
<td>82,314c</td>
<td></td>
<td>396</td>
</tr>
</tbody>
</table>

SOURCES: Health Manpower Council of California, Registered Nurses, 1970, and Board of Nurse Education and Nurse Registration Annual Highlights and Profile of Registered Nurses in California.

a 1968 data for active nurses were projected by the Board of Nurse Education and Nurse Registration based upon a sample adjusted for non-response. 1970 data were based upon response of 30,000 nurses and were not projected or adjusted. It is reasonable to assume that the 1970 data overstate active nurses because of the likelihood that inactive nurses probably would have a lower response rate.

b Ratio for 1965-68 was estimated by the Health Manpower Council of California based upon population estimates of the California Department of Finance. In 1966, the American Nurses Association conducted an inventory of registered nurses in the United States. They report 93,649 nurses in California for that year, approximately 5,000 less than the Board of Nurse Education and Nurse Registration for 1965. According to their data, 63 percent of total nurses were active. We would expect that the California data are more accurate inasmuch as they are prepared by the licensing agency.

c 1973 is estimated by applying a 65 percent activity rate to registered nurse total.
Table 17
FULL-TIME AND PART-TIME ACTIVE REGISTERED NURSES IN CALIFORNIA:

<table>
<thead>
<tr>
<th>Year</th>
<th>Full-time RN's</th>
<th>Part-time RN's</th>
<th>Full-time Percent of Total</th>
<th>Equivalent Full-time RN's^a</th>
<th>Ratio per 100,000 Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>1965</td>
<td>50,474</td>
<td>17,653</td>
<td>74</td>
<td>59,301</td>
<td>320</td>
</tr>
<tr>
<td>1967</td>
<td>50,754</td>
<td>19,741</td>
<td>72</td>
<td>60,625</td>
<td>315</td>
</tr>
<tr>
<td>1968^b</td>
<td>52,267</td>
<td>19,329</td>
<td>73</td>
<td>61,932</td>
<td>317</td>
</tr>
<tr>
<td>1970 estimate^b</td>
<td>54,948</td>
<td>22,443</td>
<td>71</td>
<td>66,169</td>
<td>331</td>
</tr>
</tbody>
</table>

SOURCE: Health Manpower Council of California, Registered Nurses, 1970, and Board of Nurse Education and Nurse Registration, Annual Highlights, and Profile of Registered Nurses.

^a Part-time nurses are assumed to practice half-time.

^b As in the previous table, 1968 and 1970 data were based upon samples. The 1968 data were adjusted and projected by the Board whereas 1970 data were not adjusted or projected and are based on a smaller sample than taken previously.
had about 386 active nurses per 100,000 population, while the U.S. ratio was 345.

4. California's nurse to population ratio relatively low in comparison with other states. These rankings, however, are misleading.

Interstate rankings of nurses in 1957 and 1966 show that California ranked 22d and 24th, respectively, among the states in nurse ratio per 100,000 population.44

In addition to the limitations of ratios as a measure of service adequacy, these interstate comparisons are grossly misleading because the demand for nursing services is primarily a function of the number of hospital beds. If states are compared on the basis of full-time registered nurses per 1000 hospital beds, California (330) ranks 4th behind Arizona (362), Hawaii (340), and Alaska (338).45

5. California benefits substantially from nurse migration, but dependence on nonstate sources of supply has declined with increases in California graduate licensees.

In 1960, 81 percent of new registered licensees came from other states or foreign countries, as shown in Table 18. This percentage has gradually declined to 60 percent in 1972 because of substantial increases in the number of California graduate licensees, which more than tripled during the 1960 to 1972 period while immigration remained relatively stable. The number of California graduate licensees has increased even more rapidly in recent years.

Annual RN immigration from foreign countries, including Canada, increased rapidly between 1960 and 1967, but declined dramatically in 1967 after foreign immigrants were required to take a licensure examination. Interestingly, new foreign licentiates have been increasing again during 1970 and substantially in 1972, indicating

44 Ibid., pp. 4, 5.
Table 18

SOURCE OF NEW REGISTERED NURSE LICENSEES: SELECTED YEARS, 1960-1972

<table>
<thead>
<tr>
<th>Year</th>
<th>New Licensees</th>
<th>California Graduates</th>
<th>Other States and Countries</th>
<th>Percent of New Licensees</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Percent of New No.</td>
<td>Foreign Other</td>
<td>Percent of New</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Countries and Canada</td>
<td>Licensees</td>
</tr>
<tr>
<td>1960</td>
<td>6395</td>
<td>1189</td>
<td>4551</td>
<td>5206</td>
</tr>
<tr>
<td>1962</td>
<td>6641</td>
<td>1239</td>
<td>4420</td>
<td>5402</td>
</tr>
<tr>
<td>1964</td>
<td>7265</td>
<td>1441</td>
<td>4584</td>
<td>5824</td>
</tr>
<tr>
<td>1967</td>
<td>7513</td>
<td>2197</td>
<td>3270</td>
<td>5316</td>
</tr>
<tr>
<td>1969a</td>
<td>8618</td>
<td>2586</td>
<td>5101</td>
<td>6032</td>
</tr>
<tr>
<td>1970</td>
<td>8423</td>
<td>2988</td>
<td>5004</td>
<td>5435</td>
</tr>
<tr>
<td>1971</td>
<td>8132</td>
<td>3265</td>
<td>4215</td>
<td>4867</td>
</tr>
<tr>
<td>1972</td>
<td>9131</td>
<td>3640</td>
<td>4039</td>
<td>5491</td>
</tr>
<tr>
<td>1973</td>
<td></td>
<td>3902</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SOURCE: California Board of Nurse Education and Nurse Registration.

*Beginning of license exam for foreign graduates.

that their exam performance has improved dramatically. After investigation, the Board of Nurse Education and Nurse Registration found evidence of fraud involving examination for potential foreign licensees.

Annual RN immigration from other states, the largest share of influx to California, shows no consistent pattern during all of the selected years between 1960 and 1972. It reached a high point in 1969 of 5101 and had declined to 4039 in 1972.

Although no current data are available on the number of registered nurses who leave California, the Board of Nurse Education and Nurse Registration does record the number of nurses in California who receive endorsements from other states. While this indicates some intention to leave the state, some nurses who receive such endorsements in fact do not leave. Data shown in Table 19 for the last four years show that
endorsements to other states have been gradually increasing between 1970 and 1973. If endorsements are assumed to be a surrogate for outmigration and are subtracted from total immigration, then it can be estimated that net immigration from 1970 through 1972 ranged between 35 and 42 percent of new nurse licensees.

Table 19
REGISTERED NURSE MIGRATION: 1969-1973

| Year | Immigration | | Net Immigration\(^a\) | |
|------|-------------|----------------|-----------------------|
|      | Total       | Endorsements  | Percent of New        |
|      | Other States| Foreign       | to Other States | Total | Licensees |
| 1970 | 5004        | 431           | 5435                 | 1883  | 3552       | 42       |
| 1971 | 4215        | 652           | 4867                 | 1997  | 2870       | 35       |
| 1972 | 4039        | 1452          | 5491                 | 2078  | 3413       | 37       |
| 1973 | 2161        |               |                      |       |            |          |

SOURCE: Board of Nurse Education and Nurse Registration.

\(^a\)The net immigration estimate is conservative because some nurses who are endorsed to practice in other states may not actually leave California. It does not account for nurses who may leave the country or go to other states without seeking endorsements, but we assume this number is small.

LVN immigrants are estimated at from 20 percent (in 1971) to 35 percent (in 1963) of new licensees, much less than RNs (see Table 20) Immigration from other states has increased substantially since 1960 to reach a high in 1970 but not as much as instate sources of supply, e.g., California graduates and those passing equivalency exams.\(^{46}\)

\(^{46}\)We employed a similar method to that used in Table 16 above to estimate the number of immigrant LVN's. Immigrants are composed of those who are licensees by endorsement (the lion's share) or by examination. Because information is not readily available on the number of LVN's who are licensed by re-exam, we have estimated annual immigration based upon those who passed the examination the first time plus endorsements from
Table 20

LVN CANDIDATES PASSING EXAM FIRST TIME AND LICENSED BY ENDORSEMENT FROM OTHER STATES: 1960-1972

<table>
<thead>
<tr>
<th>Year</th>
<th>California Graduates Passing Exam First Time</th>
<th>Equivalency Passing Exam First Time</th>
<th>Other States</th>
<th>Total Cols. 1 and 3 (4)</th>
<th>Percent of Total (3 of 4)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. (1)</td>
<td>Percent of Total (1 of 4)</td>
<td>No. (2)</td>
<td>Percent of Total (2 of 4)</td>
<td>No. (3)</td>
</tr>
<tr>
<td>1960</td>
<td>955</td>
<td>71</td>
<td>63</td>
<td>5</td>
<td>43</td>
</tr>
<tr>
<td>1961</td>
<td>1109</td>
<td>65</td>
<td>124</td>
<td>7</td>
<td>53</td>
</tr>
<tr>
<td>1962</td>
<td>1009</td>
<td>56</td>
<td>238</td>
<td>13</td>
<td>53</td>
</tr>
<tr>
<td>1963</td>
<td>1114</td>
<td>59</td>
<td>107</td>
<td>6</td>
<td>74</td>
</tr>
<tr>
<td>1964</td>
<td>1248</td>
<td>60</td>
<td>200</td>
<td>10</td>
<td>51</td>
</tr>
<tr>
<td>1965</td>
<td>1475</td>
<td>63</td>
<td>259</td>
<td>11</td>
<td>89</td>
</tr>
<tr>
<td>1966</td>
<td>1820</td>
<td>59</td>
<td>472</td>
<td>15</td>
<td>72</td>
</tr>
<tr>
<td>1967</td>
<td>1564</td>
<td>48</td>
<td>866</td>
<td>26</td>
<td>81</td>
</tr>
<tr>
<td>1968</td>
<td>2024</td>
<td>48</td>
<td>1271</td>
<td>30</td>
<td>96</td>
</tr>
<tr>
<td>1969</td>
<td>2270</td>
<td>53</td>
<td>1050</td>
<td>24</td>
<td>125</td>
</tr>
<tr>
<td>1970</td>
<td>2470</td>
<td>54</td>
<td>1051</td>
<td>23</td>
<td>105</td>
</tr>
<tr>
<td>1971</td>
<td>2692</td>
<td>58</td>
<td>1007</td>
<td>22</td>
<td>123</td>
</tr>
<tr>
<td>1972</td>
<td>2689</td>
<td>66</td>
<td>412</td>
<td>10</td>
<td>96</td>
</tr>
</tbody>
</table>

SOURCE: Board of Vocational Nurse and Psychiatric Technician Examiners.
6. California nursing program graduates and admissions have increased dramatically in recent years, and California nursing graduates have increased more rapidly than nursing graduates for the United States as a whole.

Three educational paths are open for registered nurses: a two-year Associate Degree offered at community colleges; a three-year Diploma Degree offered at hospitals; and a four-year Bachelor of Arts Degree offered at a university or college. Growth has been dramatic for Associate Degree and Baccalaureate programs, whereas Diploma programs have been gradually declining because of cost pressures on hospitals and the availability of other publicly supported programs.

Between 1965 and 1973, the number of accredited nursing programs increased from 65 to 87, with highest growth in Associate Degree (32 to 57) and Baccalaureate programs (15 to 20) and declines in Diploma programs (20 to 10—and recent additional declines have reduced them to 6). By the middle of 1974, the Board of Nurse Education and Nurse Registration anticipates 90 programs and by fiscal 1974-75, 92 programs. For LVNs, the number of training programs, primarily at community colleges, has grown from 42 in 1957 to 93 in 1972. Additional expansion is planned.

Between 1967 and 1972, the number of registered nursing graduates grew by 85 percent, admissions by more than 50 percent, and total enrollment by 35 percent, as shown in Table 21. The greatest growth has been in Associate Degree graduates, which increased by 151 percent and represented 61 percent of total RN graduates in 1972 as compared with 45 percent in 1967. Even though Baccalaureate graduates increased by 85 percent, they were 26 percent of 1972 graduates as compared with 28 percent in 1967.

LVN graduates have also increased by 85 percent between 1967 and 1972. In 1972, LVN graduates equaled 80 percent of RNs.

other states (see Table 18, this report). This understates immigration somewhat because California graduates are more likely to pass the examination the first time than those from other states, and re-exam figures are not included in these totals.
Table 21
SCHOOLS OF NURSING, GRADUATES, ADMISSIONS BY PROGRAM: 1964-1972

<table>
<thead>
<tr>
<th>Year</th>
<th>Graduates</th>
<th></th>
<th></th>
<th>RN Admissions</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RN</td>
<td>LVN</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Associate</td>
<td>Diploma</td>
<td>BA</td>
<td>Total</td>
<td>Associate</td>
<td>Diploma</td>
</tr>
<tr>
<td>1967</td>
<td>950</td>
<td>559</td>
<td>594</td>
<td>2,103</td>
<td>1,701</td>
<td>2,143</td>
</tr>
<tr>
<td></td>
<td>+24.1</td>
<td>-0.6</td>
<td>-1.9</td>
<td>+7.3</td>
<td>+29.8</td>
<td>+11.2</td>
</tr>
<tr>
<td>1968</td>
<td>1,179</td>
<td>556</td>
<td>583</td>
<td>2,318</td>
<td>2,208</td>
<td>2,384</td>
</tr>
<tr>
<td></td>
<td>+18.3</td>
<td>+5.8</td>
<td>+10.3</td>
<td>+13.3</td>
<td>+17.2</td>
<td>+4.7</td>
</tr>
<tr>
<td>1969</td>
<td>1,395</td>
<td>588</td>
<td>643</td>
<td>2,626</td>
<td>2,587</td>
<td>2,469</td>
</tr>
<tr>
<td></td>
<td>+27.1</td>
<td>-14.5</td>
<td>+14</td>
<td>+14.7</td>
<td>+10.1</td>
<td>+15.2</td>
</tr>
<tr>
<td>1970</td>
<td>1,773</td>
<td>503</td>
<td>735</td>
<td>3,011</td>
<td>2,848</td>
<td>3,025</td>
</tr>
<tr>
<td></td>
<td>+6.9</td>
<td>-2.2</td>
<td>+24.3</td>
<td>+9.7</td>
<td>+7.5</td>
<td>+15.8</td>
</tr>
<tr>
<td>1971</td>
<td>1,896</td>
<td>492</td>
<td>914</td>
<td>3,302</td>
<td>3,063</td>
<td>3,502</td>
</tr>
<tr>
<td></td>
<td>+25.8</td>
<td>-0.2</td>
<td>+11.1</td>
<td>+17.9</td>
<td>+2.5</td>
<td>+3.7</td>
</tr>
<tr>
<td>1972</td>
<td>2,386</td>
<td>491</td>
<td>1,015</td>
<td>3,892</td>
<td>3,138</td>
<td>3,630</td>
</tr>
<tr>
<td></td>
<td>+151</td>
<td>12</td>
<td>+71</td>
<td>+85</td>
<td>+85</td>
<td>+69</td>
</tr>
</tbody>
</table>

SOURCE: Board of Nurse Education and Nurse Registration, and Board of Vocational Nurses and Psychiatric Technician Examiners.
Between 1967 and 1971, California's growth in RN graduates (57 percent) was more than twice that for U.S. schools (23 percent), and California increased its share of total nursing graduates from 5.5 to 7 percent.

Interestingly, the increase in graduates of Associate Degree programs has been even more rapid in the U.S. than in California. While California Associate Degree graduates doubled between 1967 and 1971, those from U.S. schools more than tripled, and California's share of the total U.S. Associate Degree candidates dropped from 20 percent in 1967 to 13 percent in 1971.

It appears that nursing schools are planning further program expansion.

According to a 1971 report by the Coordinating Council for Higher Education, about half of existing nursing schools were planning expansion within the succeeding four years.\(^{47}\)

Increases in admissions to RN programs between 1971 and 1972 were smaller than for any period in the last five years, primarily due to declines in Diploma programs.

Between 1971 and 1972, admissions to RN programs increased 3.8 percent as compared to 10.7 percent for 1970-71 and 16.5 percent for 1969-70.

While BA programs showed a significant admissions increase (10 percent) between 1971 and 1972, growth for Associate Degree programs was quite modest (3.7 percent), while Diploma admissions declined substantially (12 percent).

It is difficult to determine whether this recent downturn in admissions has any significant future supply implications.

DISTRIBUTION

In 1970, the distribution of RNs in California varied from 755 per 100,000 population in the San Francisco Metropolitan areas to 406 per 100,000 in the San Joaquin Valley, as shown in Table 22. Clearly, urban-rural differences dominate the RN distribution pattern. The

\(^{47}\) Communication between author and Dr. R. Riese, Coordinating Council for Higher Education, week of April 7, 1974.
<table>
<thead>
<tr>
<th>Regional Areas^a</th>
<th>1965 Total RNs</th>
<th>Ratio</th>
<th>1967 Total RNs</th>
<th>Ratio</th>
<th>1968 Total RNs</th>
<th>Ratio</th>
<th>1970 Total RNs</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Coast</td>
<td>890</td>
<td>473</td>
<td>883</td>
<td>466</td>
<td>929</td>
<td>497</td>
<td>811</td>
<td>499</td>
</tr>
<tr>
<td>North Bay</td>
<td>2,571</td>
<td>612</td>
<td>2,836</td>
<td>643</td>
<td>2,978</td>
<td>660</td>
<td>3,147</td>
<td>669</td>
</tr>
<tr>
<td>San Francisco Metropolitan</td>
<td>21,064</td>
<td>716</td>
<td>22,460</td>
<td>742</td>
<td>22,854</td>
<td>747</td>
<td>23,362</td>
<td>755</td>
</tr>
<tr>
<td>South Bay</td>
<td>6,754</td>
<td>675</td>
<td>7,511</td>
<td>698</td>
<td>7,886</td>
<td>704</td>
<td>8,313</td>
<td>700</td>
</tr>
<tr>
<td>Northeast Mountain</td>
<td>831</td>
<td>453</td>
<td>884</td>
<td>466</td>
<td>837</td>
<td>440</td>
<td>944</td>
<td>488</td>
</tr>
<tr>
<td>Central Mountain</td>
<td>260</td>
<td>552</td>
<td>281</td>
<td>552</td>
<td>290</td>
<td>553</td>
<td>334</td>
<td>608</td>
</tr>
<tr>
<td>Southeast Mountain</td>
<td>92</td>
<td>500</td>
<td>103</td>
<td>528</td>
<td>109</td>
<td>551</td>
<td>107</td>
<td>498</td>
</tr>
<tr>
<td>Sacramento Valley</td>
<td>1,029</td>
<td>422</td>
<td>1,086</td>
<td>429</td>
<td>1,120</td>
<td>443</td>
<td>1,127</td>
<td>446</td>
</tr>
<tr>
<td>Sacramento Metropolitan</td>
<td>4,334</td>
<td>539</td>
<td>4,605</td>
<td>557</td>
<td>4,817</td>
<td>579</td>
<td>4,967</td>
<td>578</td>
</tr>
<tr>
<td>San Joaquin Valley</td>
<td>6,045</td>
<td>381</td>
<td>6,441</td>
<td>394</td>
<td>6,677</td>
<td>405</td>
<td>6,853</td>
<td>406</td>
</tr>
<tr>
<td>Central Coast</td>
<td>4,513</td>
<td>512</td>
<td>4,696</td>
<td>620</td>
<td>5,296</td>
<td>648</td>
<td>5,602</td>
<td>655</td>
</tr>
<tr>
<td>Los Angeles Metropolitan</td>
<td>29,059</td>
<td>494</td>
<td>41,624</td>
<td>509</td>
<td>43,088</td>
<td>520</td>
<td>44,329</td>
<td>521</td>
</tr>
<tr>
<td>San Diego Metropolitan</td>
<td>5,884</td>
<td>499</td>
<td>6,588</td>
<td>524</td>
<td>7,099</td>
<td>543</td>
<td>7,559</td>
<td>539</td>
</tr>
<tr>
<td>Southeast</td>
<td>5,112</td>
<td>460</td>
<td>5,617</td>
<td>482</td>
<td>5,956</td>
<td>501</td>
<td>6,202</td>
<td>500</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>98,438</strong></td>
<td><strong>532</strong></td>
<td><strong>105,887</strong></td>
<td><strong>550</strong></td>
<td><strong>109,936</strong></td>
<td><strong>562</strong></td>
<td><strong>113,811</strong></td>
<td><strong>564.5</strong></td>
</tr>
</tbody>
</table>

SOURCE: Health Manpower Council of California, Registered Nurses updated with information from Profile of Nurses 1970, Board of Nurse Education and Nurse Registration.

^a Counties included in each area:
- North Coast: Del Norte, Humboldt, Lake, Mendocino
- North Bay: Napa, Solano, Sonoma
- San Francisco Metropolitan: Alameda, Contra Costa, Marin, San Francisco, San Mateo
- South Bay: Santa Clara, Santa Cruz
- Northeast Mountain: Lassen, Modoc, Nevada, Plumas, Shasta, Sierra, Siskiyou, Trinity
- Central Mountain: Alpine, Amador, Calaveras, Mariposa, Tuolumne
- Southeast Mountain: Inyo, Mono
- Sacramento Valley: Butte, Colusa, Glenn, Sutter, Tehama, Yuba
- Sacramento Metropolitan: El Dorado, Placer, Sacramento, Yolo
- San Joaquin Valley: Fresno, Kern, Kings, Madera, Merced, San Joaquin, Stanislaus, Tulare
- Central Coast: Monterey, San Benito, San Luis Obispo, Santa Barbara, Ventura
- Los Angeles Metropolitan: Los Angeles, Orange
- San Diego Metropolitan: San Diego
- Southeast: Imperial, Riverside, San Bernardino
major metropolitan areas of San Francisco, Sacramento, Los Angeles, and San Diego and their immediate surroundings have higher RN population ratios than other areas. This distributional pattern appears to have changed little between 1965 and 1970. Of note are ratio increases for northeast mountain counties and decreases for southeast mountain counties between 1968 and 1970.

Again, we must point out that for nurses as for other health professionals, ratios themselves are no measure of health care adequacy. Specialization has resulted in the need to concentrate certain medical services in urban areas because a large population base is necessary to support them.

LVNs are distributed much more evenly in rural areas than are RNs as Table 23 indicates. In 1972, LVNs per 100,000 population ratio for major metropolitan areas was much lower than for rural areas (San Francisco, 197; South Bay, 145; Sacramento, 214; Los Angeles, 183; as compared with Central Mountain, 462; Sacramento Valley, 408; Northeast Mountain, 313).

EMPLOYMENT

Based on a 1968 vacancy rate survey, the Health Manpower Council of California concluded that, "In general, California is not in a health manpower crisis as measured by existing vacancies."48 For RNs, the vacancy rate was 6.9 percent for hospitals, 5.6 percent for nursing homes, and 1 percent for clinics. For LVNs the vacancy rate for hospitals was 5.3 percent.

More recent informal surveys indicate that nurses are having problems finding employment in certain California metropolitan areas. A survey of nursing directors undertaken by the Board of Nurse Education and Nurse Registration revealed that many nurses were unable to find employment in Sacramento, San Jose, San Francisco, Oakland, and San Diego.49 Recent community college surveys show that immediate

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49 Discussion with Michael Buggy, Executive Secretary, Board of Nursing Education and Nurse Registration, December 1973.
Table 23
LICENSED VOCATIONAL NURSES IN CALIFORNIA: JULY 1972

<table>
<thead>
<tr>
<th>Regional Area</th>
<th>LVN's</th>
<th>Rate per 100,000 population</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Coast</td>
<td>492</td>
<td>266</td>
</tr>
<tr>
<td>North Bay</td>
<td>1,189</td>
<td>262</td>
</tr>
<tr>
<td>San Francisco Metropolitan</td>
<td>6,172</td>
<td>197</td>
</tr>
<tr>
<td>South Bay</td>
<td>1,726</td>
<td>145</td>
</tr>
<tr>
<td>Northeast Mountain</td>
<td>568</td>
<td>313</td>
</tr>
<tr>
<td>Central Mountain</td>
<td>250</td>
<td>462</td>
</tr>
<tr>
<td>Southeast Mountain</td>
<td>31</td>
<td>158</td>
</tr>
<tr>
<td>Sacramento Valley</td>
<td>1,012</td>
<td>408</td>
</tr>
<tr>
<td>Sacramento Metropolitan</td>
<td>1,809</td>
<td>214</td>
</tr>
<tr>
<td>San Joaquin Valley</td>
<td>3,784</td>
<td>233</td>
</tr>
<tr>
<td>Central Coast</td>
<td>1,700</td>
<td>168</td>
</tr>
<tr>
<td>Los Angeles Metropolitan</td>
<td>15,449</td>
<td>183</td>
</tr>
<tr>
<td>San Diego Metropolitan</td>
<td>2,882</td>
<td>212</td>
</tr>
<tr>
<td>Southeast</td>
<td>2,635</td>
<td>216</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>39,699</td>
<td>199</td>
</tr>
</tbody>
</table>

SOURCE: Board of Vocational Nurse and Psychiatric Technician Examiners. It should be noted that population estimates used by the Board are significantly lower than those of the California Department of Finance Population Research Unit and therefore the ratios computed are probably slightly higher than if Finance estimates were used.

Regional areas are the same as those in the previous table.
job availability is low for newly graduated vocational registered nurses in some areas of California, and that there are sufficient staff nurse employees in most areas of the state, but that shortages also appear in certain inner city and rural areas. These trends, when combined with declining hospital occupancy and hospital construction, strongly indicate that employment problems are likely to get worse and not better in the near future.

The Board of Nurse Education and Nurse Registration and the Staff of the Coordinating Council on Higher Education are concerned over these trends and have begun to urge curtailment of educational programs.

In 1972, the Nurse Education Board declared a moratorium on new nursing education programs, but the Attorney General in an Opinion said they had no power to do so. The Opinion also concluded that the board was not empowered to engage in regional planning but that it did have power to make rules with respect to a course of instruction and clinical experience, implying that, while it could not do regional planning per se, it could possibly accomplish its objective by regulating courses of instruction and clinical experience. The efforts to control expansion have rested on shortage of clinical facilities and also on shortages of instructors and administrators.

Clearly, recent expansion of nursing programs is based primarily on student demand. And, clearly, students should be informed of the facts regarding nursing employment when making career choices.

These nursing supply trends indicate that with the growth of educational programs unemployment among nurses may become more serious. More systematic and comprehensive information should be accumulated on job availability and labor force participation for nurses. Stronger state action may be required to limit the expansion of education programs.

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50 Minutes of Board of Governors of Community Colleges, September 1973, Nursing Education Agenda, Item 19.


52 It is important to recognize that nurses who graduate with a B.A. degree have completed a liberal arts program that may have a variety of societal and individual values beyond nursing preparation. However, to the extent that public funds are provided to programs intended to produce nurses for whom there is little economic demand, these funds might be better spent for other public purposes.
INCREASING LABOR FORCE PARTICIPATION

If nurse labor force participation were increased, educational programs would need to expand even less. As we pointed out earlier, between 30 and 35 percent of RNs and about 23 percent of LVNs are inactive. Inactive RNs in California are mostly married women between the ages of 30 and 39.\textsuperscript{53}

Various studies have examined reasons for nurse inactivity and have suggested ways to increase nurse labor force participation. Most studies conclude that family responsibilities, particularly child care, are the major deterrent to nurse employment.\textsuperscript{54} Other significant reasons for inactivity are the need for refresher training, flexible hours, and salary increases. (See Table 24.)

Table 24
REASONS INACTIVE REGISTERED NURSES DO NOT SEEK EMPLOYMENT

<table>
<thead>
<tr>
<th>Reason</th>
<th>Percent of Responses by Inactives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family needs</td>
<td>64.0</td>
</tr>
<tr>
<td>Need for refresher courses</td>
<td>20.0</td>
</tr>
<tr>
<td>Hours</td>
<td>13.0</td>
</tr>
<tr>
<td>Husband opposed</td>
<td>11.8</td>
</tr>
<tr>
<td>Health</td>
<td>8.3</td>
</tr>
<tr>
<td>Age</td>
<td>6.1</td>
</tr>
<tr>
<td>Low salary</td>
<td>5.4</td>
</tr>
<tr>
<td>Transportation</td>
<td>4.6</td>
</tr>
</tbody>
</table>


\textsuperscript{53} California Board of Nurse Education and Nurse Registration, Profile of Registered Nurses in California, 1970.

A New York City-Rand Institute survey of inactive nurses in New York City revealed that choice of working hours, refresher training, and availability of child care facilities were the most significant prerequisites to induce inactive nurses to return to the labor force. (See Table 25.)

Table 25
PREREQUISITES FOR INACTIVES TO RETURN TO NURSING

<table>
<thead>
<tr>
<th>Condition</th>
<th>Percent of Inactives Selecting Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Choice of working hours</td>
<td>34.5</td>
</tr>
<tr>
<td>Refresher training</td>
<td>32.6</td>
</tr>
<tr>
<td>Child care facilities</td>
<td>28.4</td>
</tr>
<tr>
<td>Change in husband's attitudes</td>
<td>8.0</td>
</tr>
<tr>
<td>Help in transportation</td>
<td>4.7</td>
</tr>
<tr>
<td>Housing subsidy</td>
<td>1.4</td>
</tr>
<tr>
<td>Higher salary -- write in</td>
<td>1.1</td>
</tr>
</tbody>
</table>


Surveys in Massachusetts, Illinois, and New York show substantial interest by inactive nurses in part-time employment. In Massachusetts, 90 percent of those surveyed said they would only take part-time work. Sixty-five percent of those responding to the New York City Survey preferred part-time work. And in Illinois, 76 percent of nurses inactive in 1966, but who returned to work in 1968, were employed part time. Thus it appears that nurses could be encouraged to return to work if flexible schedules and more part-time work were available. Hospitals particularly should spend more time analyzing ways to increase nurse activity, and should undertake more research and demonstrations to assess the effects of various alternatives.
NURSING PRACTICE

Because of the various routes to nurse employment and the apparent overlap in roles of nursing personnel with different educational backgrounds, there has been increased interest in defining different levels of nursing and appropriate training requirements for those levels. The American Nurses Association suggested that there be two classes of nurses—technical and professional. Associate Degree and Diploma graduate nurses would be considered technical and BA or advanced preparation would be considered professional. The California Legislature requested that the Department of Public Health define levels of nurse practice and training required by various categories of nurses, but this was not considered an adequate basis for legislative action. Legislation has just been introduced to redefine the scope of nursing practice.55

Increased interest has also been expressed in extending the scope of nursing practice through increased use of nurse practitioners in primary care (particularly in pediatrics, obstetrics and gynecology, and in-family practice) as well as in acute and long-term care.56 Hopefully, the Health Department's Functional Task Analysis project will provide a more empirical basis for determining nursing roles and the training requirements necessary to fulfill them.


IV. MEDICAL EDUCATION

Since the days of Abraham Flexner, the medical education system in the United States has changed significantly. Medical schools gradually expanded their basic science departments and, with the growth of knowledge and information, education became more specialized disciplines that formed the basis for departments at schools and hospitals. This development, encouraged by specialty societies and boards, has progressed to the point where specialized graduate education has become the norm. According to the Goals and Priorities Committee of the National Board of Medical Examiners:

"The growth, related frequently to the services of the hospital and the interests of department chairmen, occurred with little recognition of national needs for specific types of physician manpower."  

Declining emphasis on general practice and increased emphasis on specialization and research led to few students interested in family medicine and relative isolation of clinical departments from community needs. Increased specialization, in turn, caused physicians to concentrate in large metropolitan areas.

The growth and change in medical education led to three separate training phases—medical school, internship, and residency. Undergraduate education was the prime responsibility of the medical school,

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57 Flexner authored the so-called Flexner Report written in 1910, which stressed the need for a more scientific emphasis in medical practice and recommended that medical education be a function accredited universities. "Medical Education in the United States and Canada," A Report to the Carnegie Foundation for the Advancement of Teaching, Bulletin No. 4: Boston, The Merrymount Press, 1910.

58 National Board of Medical Examiners, Goals and Priorities, p. 8.
while graduate education was the responsibility of individual program directors. The "components have had little accountability to each other and have not, either singly or collectively, been capable of responding to the health manpower needs of the nation."\cite{59} Continuing education has been viewed with "low priority" by medical schools.

Recent reforms have been proposed and actions taken to deal with some of the problems resulting from these trends.

- In 1971, the American Association of Medical Colleges endorsed the concept that "graduate medical education ultimately should become the responsibility of academic medical centers."\cite{60}
- Medical schools have substantially increased their production of physicians.
- Admissions policies have been changed to increase substantially the enrollment of women and minority groups.
- Family practice has been recognized as a specialty, and programs and departments of family practice are rapidly expanding.
- Medical school interest in delivering health care, spurred by the recent Carnegie Commission Report, has resulted in the development of area health education centers and involvement in health maintenance organizations.
- Establishment of the Liaison Committee on Graduate Medical Education, as a coordinating instrument representing diverse interests, to accredit all graduate medical education.

This brief outline of trends in medical education indicates the major influence that academic medicine has had in the evolution of medical practice.

How responsive will medical education be to society's current and future health problems?

The State has substantial interest in medical education programs because of their impact on: the supply and distribution of health professionals; the nature of medical practice and the extent and quality...

\cite{59} Ibid, p. 8.
\cite{60} American Association of Medical Colleges, Statement on Graduate Medical Education, approved October 30, 1971, Bulletin of AAMC, Vol. 6, No. 9, November 1971, p. 3.
of health services provided by faculty and students; costs borne by state taxpayers; and educational opportunity afforded to state citizens. More specific policy questions are:

1. Should the state continue to support expansion of medical schools?
2. What are the costs and benefits of medical education to the state? How should these costs be financed?
3. To what extent should publicly supported academic health centers seek to improve the distribution and delivery of medical care? How might this be accomplished?
4. How can educational programs be made more effective and efficient?
5. Should state aid be provided to private schools?

COSTS OF MEDICAL EDUCATION

Academic medical centers are relatively little understood complex institutions that produce education, patient care, and research at the same time. These "joint product" activities make it extremely difficult to allocate costs to specific outputs. In a recent Rand paper, Koehler and Williams point out that "Since only a relatively small portion of total costs are pure costs associated with a single product, there is no conceptually unambiguous way to allocate a substantial portion of the costs—that is the joint costs—of the products of health centers," and that "Any unequivocal single answer to the question of education costs must necessarily have its origins in judgment, bargaining, or politics, not in a deterministic cost analysis." 61

There are sharp differences among medical schools in the relationship of expenditures to enrollments, faculty/student and bed-per-student ratios, and in primary objectives (e.g., teaching and research). To make matters more complex, medical schools, in addition to state support, receive approximately $3 billion in federal aid dispersed through over 100 programs administered by a dozen agencies.

61 Koehler and Williams.
California now has five public University of California medical schools (Los Angeles, San Francisco, Irvine, San Diego, and Davis) and three independent medical schools (Stanford, University of Southern California, and Loma Linda).

The state provides minor support for independent schools through the medical student contract program enacted in 1972. This program, aimed at expanding enrollment, provides for grants of up to $12,000 per student, minus federal capitation funds. The 1974-75 budget contains an appropriation of about $2 million to support 189 medical contract program students. 1973 legislation also provides $3 million for a three-year state contracted family physician and physician assistant training program.

State funds to public medical education come from six sources: operating support for medical school instruction and research, clinical teaching support for university teaching hospitals, reimbursements to teaching hospitals for Medi-Cal patients (about 50 percent state cost), organized research, and bond funds for capital construction.

Table 26 shows funds sources for medical education operations for the last three fiscal years. General Fund support for the direct cost of instruction and research, e.g., excluding overhead at medical schools was 72 percent of total direct costs for the last two fiscal years and would be 75 percent for the U.C. Regents proposed budget for fiscal 1974-75. Federal capitation funds represented 8 to 10 percent of direct operating costs for 1972-73 and 1973-74.

California's 1972-73 support for medical school operations was second to New York among the states (New York appropriated over $36 million; California, $32 million). California, however, ranked 22d in state appropriations per capita and 28th in state appropriations per $1,000 of personal income. Earlier data published by Fein and Weber for the 1965 and 1966 academic years show that California ranked 26th in state medical school operational expenditures per 100,000 population and 14th in expenditures per $100,000 personal income. 62

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Table 26
SUPPORT FOR MEDICAL SCHOOL AND TEACHING HOSPITAL OPERATIONS AND
HEALTH SCIENCES RESEARCH: 1972-73 THROUGH 1974-75

<table>
<thead>
<tr>
<th>Type of Operation</th>
<th>1972-73 Actual</th>
<th>1973-74 Budget</th>
<th>1974-75 Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Medical Schools</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>45,667</td>
<td>52,062</td>
<td>56,100</td>
</tr>
<tr>
<td>General Fund (Inst. &amp; Res.)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>32,728</td>
<td>37,755</td>
<td>41,813</td>
</tr>
<tr>
<td>General Fund Percent of Total</td>
<td>71.7</td>
<td>72.5</td>
<td>75</td>
</tr>
<tr>
<td>Federal Capitation</td>
<td>4,469</td>
<td>4,412</td>
<td>4,412</td>
</tr>
<tr>
<td>Federal Capitation Percent of Total</td>
<td>9.8</td>
<td>8.5</td>
<td>7.9</td>
</tr>
<tr>
<td><strong>Human Medicine Teaching Hospitals</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>99,980</td>
<td>145,570</td>
<td>151,184</td>
</tr>
<tr>
<td>General Fund (CTS)</td>
<td>16,590</td>
<td>18,926</td>
<td>18,926</td>
</tr>
<tr>
<td>Medi-Cal&lt;sup&gt;c&lt;/sup&gt;</td>
<td>10,000&lt;sup&gt;d&lt;/sup&gt;</td>
<td>11,000&lt;sup&gt;d&lt;/sup&gt;</td>
<td>18,926</td>
</tr>
<tr>
<td>General Fund Percent of Total</td>
<td>27</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td><strong>Health Sciences Organized Research</strong>&lt;sup&gt;e&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>66,746</td>
<td>70,000&lt;sup&gt;d&lt;/sup&gt;</td>
<td>70,000&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td>General Fund</td>
<td>1,563</td>
<td>1,995</td>
<td>1,995</td>
</tr>
<tr>
<td>General Fund Percent of Total</td>
<td>2.3</td>
<td>2.8</td>
<td>2.8</td>
</tr>
<tr>
<td>Federal Grants and Contracts</td>
<td>65,183</td>
<td>68,005&lt;sup&gt;d&lt;/sup&gt;</td>
<td>68,005&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td>Percent of Total</td>
<td>97.7</td>
<td>97.2</td>
<td>97.2</td>
</tr>
<tr>
<td>Total all Sources</td>
<td>212,393</td>
<td>267,632</td>
<td></td>
</tr>
<tr>
<td>General Fund</td>
<td>60,881</td>
<td>68,676</td>
<td></td>
</tr>
<tr>
<td>Percent of Total</td>
<td>29&lt;sup&gt;d&lt;/sup&gt;</td>
<td>26&lt;sup&gt;d&lt;/sup&gt;</td>
<td></td>
</tr>
</tbody>
</table>

SOURCE: Medical school support and organized research from University of California 1974-75 Regents Budget, human medicine teaching hospital and organized research support from Governor's Budget 1972-73 through 1974-75.

<sup>a</sup> Costs of medical school instruction and records are understated because overhead (e.g., maintenance and operation of plant, administration and services) is excluded.

<sup>b</sup> The 1974-75 budget for medical schools is that proposed by the Regents. This total was reduced to $54.8 million in the Governor's Budget.

<sup>c</sup> In 1970-71 fiscal year U.C. teaching hospitals received $17 million in revenue from Medi-Cal and $19 million in 1971-72. The state pays, approximately 50 percent of Medi-Cal costs; therefore we have conservatively estimated 1972-73 state Medi-Cal costs at $10 million and $11 million for 1973-74.

<sup>d</sup> Estimated.

<sup>e</sup> Budget totals do not separate research in medicine from other health sciences research. Thus state general funds and more importantly the federal grants and contract totals represent funds for all health sciences. However, we assume the bulk of this research activity occurs in medicine.
Table 27 shows considerable variation in state expenditures for medical school operations in relation to population and income. Arizona, followed by Iowa, Texas, and Nebraska, spent the most both in terms of population and personal income; Minnesota spent the least.

State expenditures for medical school operations bear no relationship to population or fiscal capacity, and California ranks relatively low on both counts. The Carnegie Commission recommended "that states which have lagged in the past should pay for significant increases" in financial support for medical education.63

In addition to operating expenditures for medical schools, the state provides clinical teaching support (CTS) for University of California teaching hospitals. The major reason for state clinical subsidy has been to assure an appropriate mix of patients for teaching purposes by providing reduced rates for patients who are unable to bear the full cost of hospital services.

State clinical subsidy to support research and instruction programs at teaching hospitals has declined from more than 31 percent of the university hospital budget to about 13 percent today. This has resulted largely from expanded coverage through Medi-Cal, Medicare, and other third-party insurance programs. Data we have compiled for the 1970-71 and 1971-72 fiscal years show that, while state CTS accounted for about 13 percent of hospital revenue, Medi-Cal accounted for about 18 percent, Medicare 15 percent, Blue Cross 10 percent, and other sources 43 percent, as shown in Table 28. We have estimated state Medi-Cal costs to University of California teaching hospitals at $10 million and $11 million for 1972-73 and 1973-74 (approximately 50 percent state cost).

In a recent report the California Department of Finance examined the use of CTS at U.C. San Francisco hospitals and clinics.64

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64 California Department of Finance, Clinical Teaching Support.
Table 27

STATE APPROPRIATIONS FOR PUBLIC AND PRIVATE MEDICAL SCHOOLS*  
(Fiscal Years)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Alabama</td>
<td>6,086</td>
<td>1.77</td>
<td>0.52</td>
<td></td>
</tr>
<tr>
<td>Arizona</td>
<td>6,317</td>
<td>3.57</td>
<td>0.76</td>
<td></td>
</tr>
<tr>
<td>Arkansas</td>
<td>2,395</td>
<td>1.25</td>
<td>0.74</td>
<td></td>
</tr>
<tr>
<td>California</td>
<td>32,199</td>
<td>1.61</td>
<td>0.91</td>
<td></td>
</tr>
<tr>
<td>Colorado</td>
<td>4,365</td>
<td>1.98</td>
<td>0.92</td>
<td></td>
</tr>
<tr>
<td>Connecticut</td>
<td>4,085</td>
<td>1.35</td>
<td>0.79</td>
<td></td>
</tr>
<tr>
<td>Florida</td>
<td>7,438</td>
<td>2.780</td>
<td>1.10</td>
<td>0.80</td>
</tr>
<tr>
<td>Georgia</td>
<td>7,623</td>
<td>1.66</td>
<td>0.42</td>
<td></td>
</tr>
<tr>
<td>Hawaii</td>
<td>1,070</td>
<td>1.39</td>
<td>0.31</td>
<td></td>
</tr>
<tr>
<td>Illinois</td>
<td>13,636</td>
<td>3.539</td>
<td>1.23</td>
<td>0.94</td>
</tr>
<tr>
<td>Indiana</td>
<td>10,187</td>
<td>1.96</td>
<td>0.61</td>
<td></td>
</tr>
<tr>
<td>Iowa</td>
<td>8,067</td>
<td>2.86</td>
<td>0.65</td>
<td></td>
</tr>
<tr>
<td>Kansas</td>
<td>4,864</td>
<td>2.16</td>
<td>0.41</td>
<td></td>
</tr>
<tr>
<td>Kentucky</td>
<td>5,284</td>
<td>1.64</td>
<td>0.45</td>
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</tr>
<tr>
<td>Louisiana</td>
<td>4,293</td>
<td>1.18</td>
<td>0.55</td>
<td></td>
</tr>
<tr>
<td>Maryland</td>
<td>5,386</td>
<td>800</td>
<td>1.37</td>
<td>0.77</td>
</tr>
<tr>
<td>Michigan</td>
<td>20,283</td>
<td>2.29</td>
<td>0.43</td>
<td></td>
</tr>
<tr>
<td>Minnesota</td>
<td>4,197</td>
<td>32</td>
<td>1.10</td>
<td>0.31</td>
</tr>
<tr>
<td>Mississippi</td>
<td>3,348</td>
<td>1.51</td>
<td>0.48</td>
<td></td>
</tr>
<tr>
<td>Missouri</td>
<td>4,622</td>
<td>0.99</td>
<td>0.33</td>
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</tr>
<tr>
<td>Nebraska</td>
<td>3,834</td>
<td>2.36</td>
<td>0.33</td>
<td></td>
</tr>
<tr>
<td>New Jersey</td>
<td>12,526</td>
<td>1.75</td>
<td>0.33</td>
<td></td>
</tr>
<tr>
<td>New Mexico</td>
<td>2,182</td>
<td>2.15</td>
<td>0.36</td>
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</tr>
<tr>
<td>New York</td>
<td>36,105</td>
<td>8,814</td>
<td>1.98</td>
<td>0.37</td>
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<tr>
<td>North Carolina</td>
<td>8,632</td>
<td>477</td>
<td>1.70</td>
<td>0.45</td>
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<tr>
<td>South Dakota</td>
<td>795</td>
<td>1.29</td>
<td>0.34</td>
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<tr>
<td>Ohio</td>
<td>16,492</td>
<td>2,250</td>
<td>1.59</td>
<td>0.35</td>
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<tr>
<td>Oklahoma</td>
<td>3,779</td>
<td>1.48</td>
<td>0.38</td>
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<tr>
<td>Oregon</td>
<td>5,544</td>
<td>1.63</td>
<td>0.39</td>
<td></td>
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<tr>
<td>Pennsylvania</td>
<td>20,822</td>
<td>6,765</td>
<td>1.77</td>
<td>0.30</td>
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<tr>
<td>South Carolina</td>
<td>5,245</td>
<td>2.02</td>
<td>0.57</td>
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<tr>
<td>South Dakota</td>
<td>765</td>
<td>1.15</td>
<td>0.31</td>
<td></td>
</tr>
<tr>
<td>Tennessee</td>
<td>4,141</td>
<td>1.09</td>
<td>0.28</td>
<td></td>
</tr>
<tr>
<td>Texas</td>
<td>30,556</td>
<td>2,083</td>
<td>2.73</td>
<td>0.68</td>
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<tr>
<td>Utah</td>
<td>2,473</td>
<td>2.34</td>
<td>0.59</td>
<td></td>
</tr>
<tr>
<td>Virginia</td>
<td>6,995</td>
<td>1.50</td>
<td>0.35</td>
<td></td>
</tr>
<tr>
<td>Washington</td>
<td>7,028</td>
<td>2.06</td>
<td>0.46</td>
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</tr>
<tr>
<td>West Virginia</td>
<td>3,784</td>
<td>2.17</td>
<td>0.59</td>
<td></td>
</tr>
<tr>
<td>Wisconsin</td>
<td>5,141</td>
<td>1.16</td>
<td>0.27</td>
<td></td>
</tr>
</tbody>
</table>

Total: 332,610  29,416

* The data relate to funds provided directly by the state to fully operational medical schools located within the state and to state-related schools in Pennsylvania. They exclude funds provided to medical schools through regional compacts. Data are not available for direct state support provided to the medical schools located in Puerto Rico and Vermont. The 1972 state appropriations are derived from the 1972 LEAN Committee on Medical Education Annual Medical School Questionnaire. Data for Indiana and Kansas universities are based on estimates from the 1971 LEAN questionnaire. Population data for the "State Appropriation per Capita" calculation are for 1970 and are taken from the Statistical Abstract of the United States, 1972, 94th Annual Edition, page 112. Personal income data for the calculations in the last column are based upon preliminary 1972 data from the Survey of Current Business, April 1973, Vol. 55, No. 4.

## Table 28

CLINICAL TEACHING SUPPORT AND OTHER REQUIREMENTS TO UNIVERSITY OF CALIFORNIA TEACHING HOSPITALS, 1970-71 AND 1971-72

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Medicare Total</th>
<th>Medicare Percent</th>
<th>Medi-Cal Total</th>
<th>Medi-Cal Percent</th>
<th>Blue Cross/Gross Total</th>
<th>Blue Cross/Gross Percent</th>
<th>State CTS Total</th>
<th>State CTS Percent</th>
<th>Other Total</th>
<th>Other Percent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
<tr>
<td>UCSF</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1970-71</td>
<td>4,862</td>
<td>16.9</td>
<td>4,541</td>
<td>15.8</td>
<td>4,429</td>
<td>15.4</td>
<td>5,006</td>
<td>17.4</td>
<td>9,960</td>
<td>34.6</td>
<td>28,798</td>
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<tr>
<td>1971-72</td>
<td>5,608</td>
<td>17.0</td>
<td>5,778</td>
<td>17.6</td>
<td>5,001</td>
<td>15.2</td>
<td>5,220</td>
<td>15.9</td>
<td>11,303</td>
<td>34.3</td>
<td>32,910</td>
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<tr>
<td>UCLA</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>1970-71</td>
<td>4,484</td>
<td>13.4</td>
<td>3,914</td>
<td>11.7</td>
<td>2,832</td>
<td>8.4</td>
<td>4,685</td>
<td>13.9</td>
<td>17,602</td>
<td>52.5</td>
<td>33,517</td>
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<td>1971-72</td>
<td>5,245</td>
<td>13.7</td>
<td>4,047</td>
<td>10.6</td>
<td>3,037</td>
<td>7.9</td>
<td>5,085</td>
<td>13.3</td>
<td>20,789</td>
<td>54.4</td>
<td>38,203</td>
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<tr>
<td>UCSD</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>1970-71</td>
<td>4,539</td>
<td>16.9</td>
<td>6,335</td>
<td>23.7</td>
<td>780&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2.9</td>
<td>2,784</td>
<td>10.4</td>
<td>12,385&lt;sup&gt;b&lt;/sup&gt;</td>
<td>46.2</td>
<td>26,823</td>
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<tr>
<td>1971-72</td>
<td>4,420</td>
<td>15.6</td>
<td>9,088</td>
<td>32.1</td>
<td>2,301&lt;sup&gt;a&lt;/sup&gt;</td>
<td>8.1</td>
<td>2,471</td>
<td>8.7</td>
<td>10,005&lt;sup&gt;b&lt;/sup&gt;</td>
<td>35.3</td>
<td>28,285</td>
</tr>
<tr>
<td>Total All Hospitals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1970-71</td>
<td>13,885</td>
<td>15.6</td>
<td>14,790</td>
<td>16.6</td>
<td>8,041</td>
<td>9.02</td>
<td>12,475</td>
<td>13.8</td>
<td>39,947</td>
<td>44.8</td>
<td>89,138</td>
</tr>
<tr>
<td>1971-72</td>
<td>15,273</td>
<td>15.4</td>
<td>18,913</td>
<td>19.0</td>
<td>10,339</td>
<td>10.4</td>
<td>12,776</td>
<td>12.8</td>
<td>42,097</td>
<td>42.3</td>
<td>99,398</td>
</tr>
</tbody>
</table>

**Source:** Compiled from Annual Statements of University of California Hospitals and Clinics, 1970-71 and 1971-72.

<sup>a</sup> Blue Cross/Champus.

<sup>b</sup> Includes San Diego County.
It recommended a variety of methods to reduce the state's subsidy, including eliminating differences between departmental and private patients so that all are available for teaching; improving the recruitment of teaching patients by improved referral, admitting, and compensation policies; reducing use of CTS for Medi-Cal eligibles for those receiving it solely due to medical indigence; and improving the operation of outpatient clinics. Inasmuch as the state bears the full cost of CTS and approximately half the cost of Medi-Cal, any shift from CTS to Medi-Cal funding is a fiscal benefit to the state. The University is experimenting with methods to make greater use of private patients for teaching purposes but maintains that "the departmental patient is still of substantially greater teaching value than the private patient of a specific physician because students can become more immediately involved in this care," and that CTS is necessary to support educational programs in outpatient care and psychiatry where third-party support is weak. 65

Table 28 shows state support for Medi-Cal, which was approximately 18 percent of combined fiscal 1970 and 1971 expenditures and in 1971 amounted to almost $19 million. 66

In addition to operating costs and CTS, the state provides funds for organized research in the health sciences. Table 26 shows that general fund support for organized research was about $1.6 million in 1972-73, only about 2 percent of total expenditures; 98 percent was provided through federal and other restricted funds.

Table 24 presents a gross estimate of state general fund support for medical education instruction, patient care, and research, which we estimate to be approximately 25 to 30 percent of total direct costs.

In addition to operating support, the state has also provided funds for capital outlay.

65 University of California, University of California Budget for Current Operations, October 1973.
66 This amount is a reimbursement for patient care that would be a state responsibility regardless of the existence of a teaching hospital.
In 1972, the voters approved a $156 million bond issue to finance the construction of health science facilities at the University of California, with these funds to be appropriated by the Legislature. Of this amount an estimated $74 million has been allocated and an additional appropriation of $41 million is proposed in the 1974-75 Governor's Budget. These funds have been and are to be used for medicine, dentistry, optometry, veterinary medicine, nursing, public health, and pharmacy. The 1972 authorizing legislation also provided that a second bond issue (not to exceed $138 million) be submitted to the voters in 1976.

Although the initial bond issue was based upon an anticipated $98 million federal support and $71.3 million from other nonstate sources (hospital and clinic revenues) for a total $325 million program, these nonstate funds have not been forthcoming, and construction costs have been borne almost solely by the state. The revised University Health Sciences bond program calls for an increase of 630 first-year M.D. enrollments.

The fiscal picture we have presented above is incomplete because it fails to consider the offset to the state budget of federal contract and grant overhead funds on health science research grants. Table 29 shows a gross estimate of this offset.

Overhead receipts to the state from the federal government are based upon federal grant and contract expenditures. An overhead recovery rate of 51.5 percent of direct salary costs was established in 1973. Based upon agreement between the Department of Finance and the University, 50 percent of funding after deduction of certain University overhead expenditures is counted as an offset to the General Fund and 50 percent is made available for Regents Special Programs. The justification for federal assumption of certain overhead costs is that these amounts are part of operations supporting the research program. To the extent that these reimbursed overhead costs would still be incurred by the State General Fund regardless of federal grants and contracts, they are an offset to the state budget. As Table 27 shows, the health science portion is approximately one-third of the total
Table 29
HEALTH SCIENCES RESEARCH AND FEDERAL CONTRACT AND GRANT OVERHEAD
(In Thousands)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Organized Research</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Grants and Contracts and Other Restricted Funds</td>
<td>149,353</td>
<td>160,499</td>
<td>189,536</td>
</tr>
<tr>
<td>Health Sciences&lt;sup&gt;a&lt;/sup&gt;</td>
<td>47,510</td>
<td>54,388</td>
<td>65,183</td>
</tr>
<tr>
<td>Health Sciences Percent of Total</td>
<td>32</td>
<td>34</td>
<td>34</td>
</tr>
<tr>
<td><strong>Non AEC Federal Contract and Grant Overhead</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>28,111</td>
<td>31,459</td>
<td>38,775</td>
</tr>
<tr>
<td>University Overhead</td>
<td>-2,717</td>
<td>-2,847</td>
<td>-3,230</td>
</tr>
<tr>
<td>Estimated Health Sciences Offset @ .33</td>
<td>25,394</td>
<td>28,612</td>
<td>35,545</td>
</tr>
<tr>
<td>1973-74 estimated offset</td>
<td>33,804 x .33 = $11,155</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1974-75 estimated offset</td>
<td>38,146 x .33 = $12,588</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SOURCE:** Governor's Budget for selected years.

<sup>a</sup>Health Sciences includes medicine, dentistry, nursing, optometry and public health.
grant and contract total. If this percentage is applied to federal contract and grant overhead after certain overhead costs are deducted, the offset to the state budget between 1970-71 and 1972-73 ranged from $8.4 to $11.7 million. 1973-74 and 1974-75 offsets are estimated at $11.2 and $12.6, respectively.

Because medical schools product joint products (teaching, research, and patient care) then conceptually the marginal cost of each output is reduced by the existence of the others, and costs would be higher if each were performed separately. From the state's viewpoint, the marginal cost of education is reduced because of federal overhead funds generated by health sciences research and by patient care revenues from a variety of sources that may be used to support the educational program. Similarly, the marginal cost of patient care is reduced to the extent that patient care is provided without fees to CTS and Medi-Cal patients.

Viewed from this standpoint, one can argue that, because it is subsidized by federal research grants, patient care reimbursements, and capitation grants, medical education has been "a bargain" for the state, especially inasmuch as it imports so many physicians trained elsewhere.

"The problem arises," as Koehler and Williams point out, "when the consumers of these different products—or those who are unwilling to subsidize the consumption of others—insist on a simple, seemingly very reasonable principle that they pay only their share of the costs."

So the State Finance Department would like to reduce CTS because of increased third party payments; however, a prepaid health plan (e.g., the Sacramento Medical Care Foundation), which negotiates rates with providers of care for Medi-Cal patients, would not ideally include education costs in its rate structure.

In addition, governmental officials may feel it is inappropriate for faculty and staff to charge fees for state supported patients because the faculty and staff are already reimbursed by the state through salaries and stipends. The state, however, would pay these fees for patient care outside the teaching hospital. Moreover, faculty
members do charge fees to private patients; such fees usually go into faculty plans used primarily to fund the compensation paid to faculty members over and above base salary rates provided through general funds.

This section has pointed out the complex interplay of funds for the joint product activities of medical schools. It highlights the need to examine the total impact and interplay of various sources of funds on medical school operations and outputs. Such an approach may provide useful insights into medical school operations and costs, and help to analyze the question of who should bear the burden—the federal government, the state, patients, providers, or students? It appears that allocating these costs will essentially be left to judgment and the political process.

**SHOULD THE STATE CONTINUE TO SUPPORT MEDICAL SCHOOL EXPANSION?**

A state may choose to increase or redirect its support for medical education to achieve a variety of objectives:

- To increase the number of medical school graduates and thereby the aggregate supply of physicians in the nation and, from the viewpoint of the investing state, its own supply.
- To provide educational opportunity for state citizens.
- To improve specialty or geographic distribution of practitioners and services.
- To make the state or particular areas more attractive to health professionals who might be encouraged to locate there because of the existence of a medical school, a medical school affiliated program, or graduate medical school opportunity.
- To improve the quality of care through provision of medical school based services.

Clearly, a major objective of recent federal policy has been to expand medical school enrollments to meet physician "shortages." This
has been successful inasmuch as enrollments have expanded rapidly since 1965-66, the first year of federal formula grants for enrollment expansion. Federal capitation grants provided further incentive for enrollment growth and construction of new public medical schools after 1971.67

Policy at the Department of Health, Education, and Welfare has apparently shifted. Dr. Charles Edwards, Assistant Secretary for Health at HEW, recently told the American Medical Association in November 1973 "that there is little reason to adopt a manpower policy that involves investing large sums of money to further train health professionals" and suggested instead (1) that greater emphasis be placed on improving physician productivity, and (2) that more attention be paid to improving the quality and distribution of medical care.

As we pointed out earlier, California's physician supply has grown faster than its population. This has resulted primarily from an increase in U.S. medical school graduates and their propensity to locate in California. Given these trends and the fact that aggregate growth apparently has not effected substantial distributional benefits, there is a serious question regarding whether California should continue to support expansion of undergraduate medical education merely to increase the aggregate supply of physicians in the state. According to Fein:

"If medical school expansion is financed in order to create more doctors because some persons are without sufficient physician services, then it must be recognized that additional personnel will not necessarily make these services available to those very people. In that sense the policy is ineffective. 68"

Moreover, as Blumberg has noted, "There is no evidence to support the assumption that the number of physicians who migrate to a state is

67 Koehler and Williams, p. 15.
68 Fein, p. 149.
independent of those graduated within the state." Fein and Weber find, "Empirical analyses indicate the ability of states to attract new physicians is only marginally improved by increases in the number of physicians graduated from medical schools in the state." And Blumberg concludes that, "Increasing the number of M.D.'s graduated from California is likely to be a costly and ineffective way of increasing physician supply in the state." Thus it is possible that increasing the number graduated within a state may negatively influence migration, and it is erroneous to assume that increasing state graduates may have no affect on immigration of other physicians.

California, however, which is considered a "predator state" by those who train physicians who then migrate here, might increase state expenditures for medical education to avoid potential sanctions by other states or the federal government (although it is difficult to envision what form such sanctions might take).

Moreover, because continued immigration at the recent rates is no certainty for the future, a state like California may wish to expand its undergraduate enrollment substantially as a cushion against a possible downturn in physician immigration or because of potential increases in the demand for medical care as a result of some form of national health insurance.

California offers its residents relatively little opportunity to enter medical school and may choose to expand educational opportunity for its citizens by increasing medical school student places. In 1971, while California ranked second among the states in the number of entering medical students and ninth in per capita income, it ranked 42d in entering medical student places per capita. (In 1967, it ranked 25th). While California ranked 2d in the number of applicants applying to U.S. medical schools in 1971, it had the third lowest acceptance rate.

70 Fein and Weber, p. 162.
71 Blumberg, p. 13.
In 1967, 62 percent of Californians entering medical school were educated in the state. As public medical schools with residence preference continue to grow, Californians will have to rely increasingly on their home medical schools for this educational opportunity. Thus California may choose to expand enrollments to provide increased educational opportunity for its own citizens. As we have noted, however, many authorities have raised questions about the public benefits of medical school enrollment expansion, whereas the private benefits of medical education are quite substantial. If expansion is undertaken primarily to benefit individual students, then a strong argument can be made for increasing the cost burden on the students, particularly if liberal loans and long repayment periods are available. The issue is clearly more significant for public as opposed to private schools. Estimated tuition for 1974-75 at University of California Medical Schools ranges from $681 at UCLA (for three quarters) to $908 at U.C. Irvine for four quarters,\(^{72}\) while tuition at Stanford is $3345, Loma Linda $3200, and USC $3040. If tuition at the public schools were raised to $3200, then the state would receive more than $4.5 million in additional revenue (if enrollment remained the same) which could be used to finance medical school construction, thereby making medical education available to additional state citizens.

Expansion or redirection of graduate medical education has a variety of potential benefits to California:

1. House staff positions provide a first experience for new physicians to examine practice opportunities in California and thereby facilitate their location. California has had a large intern and resident program relative to its undergraduate enrollment and attracts a significant number of house staff who have taken their medical education elsewhere.

2. Interns and residents prefer positions with university affiliated hospitals. Therefore medical school house staff positions help attract new physicians. California medical schools fill almost all their house staff positions and there is reason to assume that additional positions can also be filled.

\(^{72}\) Journal of American Medical Association, November 19, 1973, Table 2, p. 900; U.C. Davis $670; U.C. San Diego $800, and UCSF $700.
3. House officer programs may attract physicians to an area because they facilitate their hospital practice.

4. Interns and residents provide a significant amount of patient care. As of December 1972 house staff comprised 14 percent of total patient care physicians in California. Moreover, house staff programs at medical school affiliated hospitals, which may be located at some distance from a medical schools, may help to improve the delivery of care in areas of need and aid development of clinical ties between these areas and medical schools.

5. The distribution of internships and residencies by specialty and geography significantly determines the specialty and geographic distribution of future physician supply.

SPECIALTY AND GEOGRAPHIC DISTRIBUTION

In June 1973 an AMA approved report to its House of Delegates entitled The Distribution of Physicians by Medical Specialty noted that the percentage of residents in training in primary care specialties (39 percent) is lower than the percentage now in practice in those specialties (40 percent) and concluded that the "AMA should adopt and immediately publicize widely and promote vigorously a goal to have at least 50 percent of all medical graduates enter residency training in the primary care specialties (especially family practice) in the coming years."

A common assertion is that a declining proportion of medical students enter general or family practice because of the "specialist-scientist" bias of medical schools. Rand's recently released interim report, Federal Manpower Legislation and The Academic Health Centers, points out that the proportion of students expressing preference for specialty over general practice rises as they progress in medical schools. However, there does not appear to be a positive correlation between variables capturing part of the scientific and postgraduate emphasis of a school, i.e., size of research program and concentration on postgraduate education and medical graduates specialty training decisions. The report concludes that, although this is not a very
powerful test, the contention that federal support of research and postgraduate training results in greater specialization of internships, residencies, and practice is not supported by the data.

As of July 1973, 37 percent of University of California internships and residencies were in primary care, 3 percent in rotating internships, and 60 percent in other specialties. (See Table 30.) In 1971, 45 percent of active nonfederal physicians in California were in primary care fields. Also AMA Journal data on residencies by specialty show that 49 percent filled residency positions in the United States were in primary care fields.73

Table 30

INTERN AND RESIDENT ENROLLMENTS: UNIVERSITY OF CALIFORNIA, JULY 1973

<table>
<thead>
<tr>
<th>Type of Care</th>
<th>Number</th>
<th>Percent of Primary Care</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Care</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family Practice</td>
<td>155</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>Internal Medicine</td>
<td>608</td>
<td>54</td>
<td></td>
</tr>
<tr>
<td>Pediatrics</td>
<td>253</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>Ob-Gyn</td>
<td>102</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Total Primary Care</td>
<td>1118</td>
<td>100</td>
<td>37</td>
</tr>
<tr>
<td>Rotating Internships</td>
<td>86</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>All Other Specialties</td>
<td>1799</td>
<td></td>
<td>60</td>
</tr>
<tr>
<td>Total All Specialties</td>
<td>3003</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SOURCE: University of California Office of the President.

73 Ibid, Table 8, p. 927.
The Committee on Goals and Priorities of the National Board of Medical Examiners expressed some skepticism about specialty trends. They said: "It remains to be seen, however, whether this potential increase in the output of primary care physicians will be offset by present trends toward subspecialization in the traditional primary care specialties of Internal Medicine and Pediatrics."\(^{74}\)

Dr. Leopold Snyder, Chairman of the AMA Council on Rural Health, also expressed skepticism when he told a legislative committee:

> It is my feeling that training institutions have been quite insensitive to the needs of the community as far as specialties are concerned. I think that [the arms of] many of those pushing young men and women into some specialties, such as general surgery or some of the other over-populated specialties, have been to serve the institutions and not to serve the medical needs of the community...I believe we have to do a considerable amount of gut-kind of talking with training institutions...at some point society is going to have to say, enough general surgeons...I really believe that we have come to a point where either we use moral persuasion and if that works, fine. If not, we have to use every weapon that we have and dollars are a very effective weapon."\(^{75}\)

In 1973, the Governor's Budget deleted the University's request for additional interns and residents. The University subsequently requested funding for 104 additional residency positions in primary care specialties. This request was granted by the Legislature but came so late in the year that only 85 were established. Funds for the 85 are continued in this year's Governor's Budget.

The June 1, 1973, Report of the Joint Legislative Committee on Siting of Teaching Hospitals said:

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\(^{74}\) National Board of Medical Examiners, _Goals and Priorities_, p. 11.

\(^{75}\) L. Snyder, Assembly Select Committee on Health Manpower, Transcript of Hearing on the "Medical School Needs of the San Joaquin Valley," Fresno, California, September 12, 1972, pp. 16-17, 21.
The Joint Committee believes that the University, and particularly its never medical schools, have a responsibility, as publicly funded agencies, to meet this public need (for primary care physicians). A shift in the allocation of specialties among medical residency programs and the establishment of departments of family practice are two methods by which the University can assist in meeting the objective of increasing the number of primary care physicians in California. 76

The language inserted in the 1973 Budget Act further indicates the pressure on the University to meet primary care needs:

The University shall present to the Legislature...a plan to redirect resources within existing university medical education programs to meet the State's need for primary care health care services and physicians, especially family practice physicians... Consideration shall be given to... development of new departments of family practice within medical schools...decentralization of medical education programs to include community facilities as sites for medical education...expansion of house officer programs in primary care, especially in the field of family practice. 77

In its recent report in response to Legislative request, the University calculated that 30 percent of the 1972-73 residency enrollments were in primary care fields and set a goal of 47 percent primary care residencies which it hopes to achieve within five years. 78

In its report, the University suggests that the problems and solutions to encouraging more primary care physicians also lie in developing "role models" by implication rejects the value of establishing Departments of Family Practice noting that

Demonstrated clinical skills and the ability to bring a breadth of scientific knowledge to bear effectively in the solution of real problems of patients give professors the greatest prestige in the eyes of students; such prestige,

76 Joint Legislative Committee on Siting of Teaching Hospitals, Recommendations Concerning a Prepaid Teaching Hospital at the University of California, Irving, June 1, 1973, p. 5.
77 Section 316.4 California Budget Act of 1973.
78 University of California, Primary Care Services Report to the Legislature, Table I, p. 10.
is not automatically bestowed by rank or position within an organizational structure. The place of an academic unit within the organizational structure of a medical school does not in itself give academic prestige or attract students.  

On the other hand the University proposes to develop and strengthen programs in family practice by reassigning current positions or assigning new positions and says that with adequate clinical teaching support and "start-up" funds,  

All of the University's health science centers are eager to establish rural practice models to be used for teaching primary care and for research into the organization of health care in rural areas. Some of the University's experience over many years in its Agricultural Extension Division is immediately applicable to a similar enterprise in health... Similar comments apply to primary care centers in deprived central city areas.  

Forty-nine medical schools in the United States now have undergraduate programs in family practice, and there were 25 full departments by mid-1973. The number of family practice residencies has also been rapidly increasing, and 86 percent of the first-year residencies in 1973 were filled. Despite these encouraging signs, the redirection of physicians away from specialty care and into primary care is no mean task. Primary care specialists are less prestigious than other specialists and subspecialists, are rewarded less handsomely financially, and generally have less status professionally than their more specialized colleagues. Thus at the University itself, where specialists have traditionally predominated, it will be most difficult, without substantial support and pressure from others, to reorient training programs to produce more primary care physicians.  

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79 Ibid., pp. 5, 6.  
80 Ibid., p. 7.
One of the problems of providing appropriate training for primary care physicians is the difficulty medical schools have in operating ambulatory care centers. Rand's report on federal health manpower legislation points out that:

Where the quality of service in teaching at outpatient clinics is competitive with that of private medicine, the ratio of costs (excluding the M.D. professional fee) per visit in a teaching setting to costs per visit in a private (nonteaching) setting appears to fall in the range of 2:1 to 3:1. Since the politics of third-party insurers make no provision for covering the educational costs of ambulatory care, and since the pricing policies of academic health center clinics are constrained by the fact that they are in direct competition with local physicians in the provision of service to nonsponsored patients, these added costs must be funded from other sources.81

This cost pressure makes it difficult for medical schools to support training in ambulatory care settings.

The report also concludes that, if federal support for medical education is reduced, primary care programs are likely to suffer unless other offsetting means of governmental support are provided. If schools attempt to offset revenue losses by increasing faculty practice, this will most likely occur by expanding secondary and tertiary care which receives greatest third party reimbursement and perhaps decreasing primary care.

Planned special federal support for primary care programs may prevent cutbacks but those institutions not receiving these grants are likely to find difficulty in supporting primary care programs at their present level and responsibility for funding primary care programs may become an area of increased State fiscal responsibility.82

81 Carter, Chu, et al., pp. 34-35.
82 Ibid., pp. 86-88.
GEOGRAPHIC DISTRIBUTION—THE SITING OF MEDICAL SCHOOLS

The location of medical schools and medical school clinical affiliations may affect the geographic distribution of care and improve the attractiveness of certain areas to physicians. Thus, while expansion of medical school places may not be justified to increase the aggregate supply of physicians in a state like California, there may be some justification for improving the geographic distribution of care in rural areas or inner cities. Previous data have illustrated the relationship of physician growth to medical school location in the Sacramento, San Diego, and Orange County areas. Location of medical schools in relatively underserved areas can improve the climate for medical practice in those communities through the availability of continuing education, assistance of house officers, availability of tertiary care services and other professional satisfactions.

A specific question that has faced developing health science centers around the nation is whether there is a need for the on-campus teaching hospital. Some states (e.g., Michigan and Illinois) have developed medical education programs that rely on affiliations with community hospitals and do not involve construction of on-campus teaching hospitals.

The Joint Committee on Siting of Teaching Hospitals has concluded that "Every medical school does not require its own on-campus teaching hospital." After hearing testimony that revealed a wide diversity of institutional arrangements among medical schools, with some states utilizing community resources as settings for medical education programs, the committee concluded that "this has been done because of the cost savings which may accrue and because the educational experience received in these settings are considered more relevant to the preparation of needed primary care physicians"... and that "only the minimum number of University on-campus hospital beds consistent with good medical education programs and the availability of alternative off-campus facilities should be constructed." 83

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83 Joint Committee on Siting of Teaching Hospitals, pp. 6, 7.
The University of California has taken the position that "whether community programs of this type can be operated at the level of quality of traditional medical school programs or at less cost is yet problematical," and maintains that in addition to service in community-based programs, we believe it is equally important that a portion of each student's training be in a facility under University control where specialized and academically oriented activities can be seen, and an understanding be gained as to which patients seen in practice can be expected to benefit by referral to tertiary co-institutions. It is in this facility that students can participate in clinical activities which are harbingers of the future.84

Interestingly, the University is developing a new program at Berkeley involving the San Francisco Medical School and East Bay community clinical resources. Additional state funds are requested to support this project as well as to plan a medical education program at Fresno.

AID FOR PRIVATE SCHOOLS

The Carnegie Commission for higher education has recommended that states provide financial aid for private institutions involved in health manpower education.85 We have briefly described two recent California programs that furnish support for expanded enrollment and for family practice residencies and physicians' assistant training.

Legislation has also been introduced that would provide financial support for diploma nursing programs.86 While we have not examined the specific costs and benefits to the state of support for private schools, from the state's viewpoint it seems essential that the total resources

84 University of California, Primary Care Services Report to the Legislature, p. 25.
85 Carnegie Commission, p. 82.
86 California Assembly Bill No. 3210, G. Duffy, February 21, 1974.
for higher education be utilized to meet state objectives and that the state should not be precluded arbitrarily from investing in private institutions to achieve public objectives. Fein and Weber concluded that state support for private schools would be preferable to building new public schools or to having private schools close, thus passing additional cost burdens onto the state.

Faced with the alternatives of starting a new school, taking over an existing school and making it public, or giving incremental aid to private institutions, the state may find that, from its point of view, the latter represents the most efficient solution. 87

Medical education programs have played and will play a substantial role in determining the supply, distribution, and quality of care throughout the state and in particular regions of California. Although there may be serious question about the need to expand medical school enrollments to enlarge the aggregate supply of physicians in California, there appears substantial justification for redirecting medical education resources to meet state needs both for primary care services and provision of care in rural areas and inner cities.

To improve the application of higher education resources to meet state needs, the state should develop a more systematic planning and programming effort to better utilize the full range of public and private higher education resources in California. We shall discuss this further in the section on "A Structure for Health Manpower Programming."

87 Fein and Weber, p. 182.
V. HEALTH MANPOWER LICENSURE

California state licensure boards now establish qualifications for entry into health professions, define the scope of practice for health personnel, and are responsible for the maintenance of professional standards.

Although the original purpose of health professional licensure laws was to protect the public from abuse, many authorities have concluded that current licensure practice tends to limit the rational allocation of manpower resources through unnecessarily restrictive and artificial requirements that block the delegation of tasks and hamper career mobility. It is alleged that these laws increase costs and have relatively little impact on the quality of care or the protection of public health and safety because licensure boards have not effectively monitored licensee performance. Many have urged adoption of a more flexible licensure and training system that would allow qualified people to function as part of a health care team or matrix, measured by capability, training, experience, and performance—not merely by a categorical title.

Despite these suggestions, attempts to reform licensure laws have in part foundered on this dilemma: proposals for change have remained undocumented because existing licensure laws and regulations discourage innovation and controlled experimentation with new forms of delivery and nontraditional allocation of health manpower tasks. Thus the case for reform has not successfully been made in part because experimental efforts that could document the need for change have themselves been discouraged by these same laws and regulations. In addition, changing and emerging health care roles have made it difficult to determine which tasks are or should be performed by different professionals and how these various professional roles interrelate. Moreover, proliferation

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of health occupations and fragmentation of the present personnel licensure system promotes a patchwork of statutorily "walled" categories that tend to inhibit optimal resource allocation. This runs counter to emerging trends for more organized methods of health delivery utilizing teams of health professionals in group practice settings.

Most state licensing boards are composed of representatives of groups that they regulate. Very few include representatives of the general public. "They have considerably stronger links to their respective professional associations than do other public agencies concerned with health." Professional interest and influence clearly has stood in the way of licensure reform in most states, making cooperative efforts between professions difficult to achieve and impeding career mobility. After initial entry into a health occupation, licensure laws and certification processes generally specify the additional formal requirements that must be satisfied in order to move to a more responsible position within the same health field or to a similar position in a related health field.

A major resistance to the enlargement of career mobility in health professions comes from professional organizations that place a premium on the selectivity and high standards required for membership. Licensure certification and accreditation are thus viewed in some quarters as symptomatic of the professionalism that has become a primary value in health occupations, almost preempting such values as the practitioner's skills and competence in job performance.

This is not to say that removal of licensure impediments would by itself result in ideal allocation of manpower resources. Many factors influence manpower allocation: credentialing and certification by private bodies and educational institutions; facility licensure; financing; wages and working conditions. Actions of professional

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90 Ibid, p. 51.
associations, personnel and staff requirements of payment programs, among others, probably have as great or probably greater impact on manpower utilization than licensure requirements per se. It appears, however, that rigid licensure requirements do constitute a stumbling block that inhibits positive change. These same laws leave unregulated the functions of many aides, technicians, and auxiliaries whose supervision is primarily the responsibility of the institution for which they work.

The following discussion reviews six suggestions for improving the licensure system as shown in Table 31. It is based upon objectives that are most frequently mentioned in the licensing literature.  

PROVIDE FOR PUBLIC ACCOUNTABILITY AND PROMOTE COORDINATED HEALTH MANPOWER REGULATION

The Report of the Secretary of Health, Education, and Welfare on Licensure and Related Health Personnel Credentialing notes:

Only a few years ago, issues such as licensing, certification, and accreditation were generally thought to be the concern of only the professional individuals and organizations that were affected by them. The public policy aspects of these issues were not often perceived by decisionmakers, long accustomed to the guild traditions that have characterized attitudes in this area. Today, these matters are not immune from public criticism, and the responsibility of both public and private leadership to fuse health manpower credentialing with the public interest.  

To strengthen the healing arts licensure boards by improving their public accountability, this report recommended increased coordination and liaison among the various health licensing boards and between them and other governmental health agencies responsible for the planning

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91 For a summary of licensure reform alternatives and constraints on their implementation see R. Roemer, "Legal Regulation of Health Manpower in the 1970's," HSMHA Health Reports, December 1971, pp. 1053-1063.
Table 3.1

**LICENSURE REFORM ALTERNATIVES**

Hypothetical Objectives and Alternative Actions

1. Provide for public accountability and promote coordinated health manpower regulation.
   a. Create a single health manpower regulatory entity—a board or department.
   b. Consolidate existing boards or functions, i.e., nursing, allied health manpower.
   c. Increase public and interprofessional membership on boards.
   d. Improve coordination of activities between boards.

2. Eliminate unnecessary legal barriers to improved productivity, career mobility, and innovation.
   a. Support experimental programs to assess the impact of different manpower roles and educational approaches.
   b. Encourage equivalency and proficiency exams.
   c. License nurse practitioners and other "expanded role professionals."
   d. Conduct "task analysis" of various professional activities to determine scope of practice and educational requirements.
   e. Implement "institutional licensure."

3. Improve regulation of quality beyond entrance.
   Adopt recommendations of National Board of Medical Examiners' Committee on Goals and Priorities for specialty licensure and continuing education as a basis for relicensure.

4. Facilitate improved geographic and specialty distributions.
   Specialty licensure, geographic licensure.

5. Facilitate geographic mobility.
   National examinations.

6. Evolve a flexible system responsive to change and related to patient care requirements.
   Remove artificial barriers, develop performance standards, conduct research and analysis on proposed changes and evaluate innovations.
and monitoring of health services; that boards include representation of consumers, of more than one health profession, and of the various types of health-delivery settings such as group practice, public institutions, and others in policymaking functions; and that boards be provided with the necessary funds and staff to discharge increased public responsibilities for high quality care. 93

One suggestion for reducing professional influence on licensure boards recommends centralizing the licensure function in a State Health Department that would still give professional associations a strong voice but temper that "through a State Agency which can reconcile the interest of the general public with that of the private associations." 94 There is no evidence, however, that links to professional associations will be any weaker if the boards are located in a health or education department or in the Governor's office.

Inasmuch as the tasks of health professionals overlap and are changing and health care is increasingly being delivered through organized systems that utilize teams of professionals, suggestions have been made to establish coordinated responsibility for all health professions licensure in a single agency or board with sufficient flexibility to adjust regulations to changing conditions of practice. The Governor of Massachusetts last year submitted legislation abolishing licensure boards as separate state agencies, assigning their functions to Health Systems Regulation Administration in the Department of Human Services. Committees would be established under the bill for consideration of specific matters related to health occupation. 95 Such an approach was politically unacceptable to the professions in Massachusetts as it most likely would be in California. Additional research should be undertaken to define the scope of activities for such a Board, its makeup and potential functions as well as its implementation problems.

93 Ibid, p. 76.


95 Massachusetts House Bill No. 6120, 1972.
In California, the Reorganization Plan creating the State Health Department would have transferred the various healing arts licensure boards from the Department of Consumer Affairs to the new department. The Task Force that proposed creation of the Health Department said that the new arrangements

will facilitate the coordination of the licensing functions with health manpower planning. It will provide a better climate for innovation in meeting the rapidly expanding demand for health manpower. It will be better able to eliminate artificial barriers that exist among health professional classifications. It will provide a better framework within which to evaluate the need for new professional boards when new specialties emerge with a request for licensure. And a Department of Health will be in a position to encourage the educational institutions to develop new and improved courses of instruction.

An additional objective was to encourage "those responsible for licensing the health professions to tailor their credentialing requirements so that they are truly relevant to the tasks to be performed." 96

1973 legislation delayed the transfer of the boards for four years. The specific impact of transferring the healing arts boards is difficult to assess because the Reorganization Plan would not have changed the separate statutory authority under which the boards operate. One can assume, however, that they may have been more responsive to the Director of Health and less so to the professions they regulate.

While creation of a single licensure board for all health professions may not be feasible or desirable in the short run, other steps may be taken that either consolidate licensure functions or promote interprofessional cooperation and may result in more incremental improvements.

Because of a proliferation of allied health occupations with different requirements for entry and little control over quality, and their demands for licensure, it might be desirable to establish a single board with jurisdiction over all allied health occupations. Such a board could attempt to relate educational and other requirements to health tasks and reduce fragmentation of licensed occupations. A moratorium on new licensed categories suggested by various professional groups has slowed down new allied health licensure.

This year legislation has been proposed that would consolidate the state's two separate nursing boards with equal representation of registered and vocational nurses as well as three public members and representatives of educational institutions. Such a single board could be helpful in clarifying nursing roles, educational, and licensure requirements.

**ELIMINATE UNNECESSARY LEGAL BARRIERS TO IMPROVED PRODUCTIVITY, CAREER MOBILITY, AND INNOVATION**

Personnel licensure significantly affects the career mobility of health professionals. As we have pointed out, these processes regulate entry and provide formal education, training or experience requirements for either vertical or lateral career mobility or delegation of tasks. In many instances these formal requirements may bear little relationship to skills required for job performance and may constitute an unnecessary stumbling block toward career advancement, often barring minority group members from professional careers and advancement. Suggestions made above to create a single licensure board or to consolidate some existing ones could have a beneficial effect on productivity and career mobility by authorizing a broader scope of practice and improving articulation between educational programs.

**Proficiency and Equivalency Tests**

Two methods of improving career mobility involve the use of equivalency qualifications and proficiency examinations.

Equivalency testing is used to equate nonformal learning or experience with formal academic training, while proficiency tests are aimed at measuring an individual's capability to perform a job at a certain level.
California has enacted legislation that recognizes equivalency qualifications in the nursing field, thereby allowing those with health care experience to enter and move up the professional ladder without the need to fulfill certain specific educational requirements. Legislation in 1969 allowed medical corpsmen to become registered nurses based upon board approval of training and passing an exam; and eased LVN to RN mobility allowing credit for training and mandating not more than 30 additional units as a basis for exam taking. Legislation recently introduced (AB 2879 by Assemblyman Duffy) required the Board of Nurse Education and Nurse Registration to develop a standard equivalency exam for each course required for licensure as a registered nurse. While some educational institutions may view this as an intrusion on their prerogatives, the legislature has been concerned that educational institutions have not been responsive enough in accepting equivalency qualifications.

Another approach suggested to improve productivity and career mobility has been to promote the use of paramedical personnel. The President in his 1971 Health Message to Congress said:

One of the most promising ways to expand the supply of medical care and to reduce its costs is through a greater use of allied health personnel, especially those who work as physicians and dentists’ assistants, pediatric nurse practitioners and nurse midwives. Such assistance frees a physician to focus his skills where they are most needed and after allows him to treat many additional patients.97

Physician’s Assistant

At a 1971 conference concerned with legal issues involving utilization of physician’s assistants (PAs) the delegates agreed that rather than enact separate laws regulating PAs, existing medical practice acts should be amended to provide a flexible method of authorizing practice without limiting change or introducing rigidity.

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Some states permit broad delegation of physician's functions to an assistant; other proposals provide for specific regulation by the State Board of Medical Examiners.

1970 legislation mandated the Board of Medical Examiners, with the assistance of the California Advisory Committee on Physician's Assistant and Nurse Practitioner Programs, to approve educational programs to train physician's assistants and approve applications of physicians to supervise a graduate of such a training program. Since the legislation was enacted, six California training programs have been approved: two programs for training assistants to primary care physicians are Charles Drew Postgraduate Medical School/UCLA, and Foothill College/Stanford University Hospital; Cerritos College will train assistants of orthopedic physicians; and USC and UCLA will also train emergency case physician's assistants. As of May 1974, 19 PAs were granted interim board approval, 6 applications are pending, and 15 were employed in California. 98

Our discussions with the staff of training programs and with physician assistant employers have revealed the following problems:

From the viewpoint of a practicing rural physician, the regulations defining the scope of PA practice are too limiting. According to a practicing physician in rural California, his PA

cannot do what he is adequately trained to do. Specifically, he cannot conduct a complete physical examination; he cannot practice in a hospital even to check on patients on weekends; he can't practice alone under supervision, and he can't do some things a nurse can do even though I have to pay higher malpractice rates for him than for her.

This physician pointed out that patient response has been good and that the local medical society was responsive. He also said that

98Letter to author from Board of Medical Examiners, May 29, 1974.
because of age he wants to reduce his work hours and has for some years been unsuccessfully trying to get a physician to locate with him. His feeling was that the PA was a substantial asset but would get discouraged and leave California because of restrictions on practice.

The staff of a PA training program who were interviewed generally agreed with these conclusions and suggested that they were typical of concerns expressed by other primary care physicians. They also indicated that there were major delays in getting training programs approved and delays in getting specific approval by a physical to utilize a graduate PA, sometimes resulting in six months' delay before a graduate could perform what he was trained to do. Training program staff stressed that a major training element has been to teach PAs to know their own limitations, that they are capable of practice alone, and that narrow interpretation and slow implementation by the Board of Medical Examiners was undermining the training program and acting as an inducement to illegal practice.

The Legislature authorized the employment of physicians' assistants "to encourage the more effective utilization of the skills of physicians by enabling them to delegate health care tasks to qualified persons, to encourage the utilization of physicians' assistants by physicians and to provide that existing legal constraints should not be an unnecessary hindrance to the more effective provision of health services." 99

If one of the PA program's major goals is to both relieve overworked physicians in rural and to improve productivity, it appears that narrow interpretation of this legislation is impeding the basic purpose of the law. 100

100 As we stated earlier, empirical studies show that use of physician's assistants has not resulted in anticipated productivity gains in terms of increased visits primarily, it appears, because physicians who use them reduce their own working hours.
Nurse Practitioner

An additional responsibility of the Advisory Committee to the Board of Medical Examiners mandated by 1972 legislation was to report to the Legislature and affected licensure Boards on the status of nurse practitioner education and training programs and to make "recommendations for establishing a permanent program of certification or licensure for nurse practitioners."

In its December 1973 report, the Advisory Committee recommends certification or licensure of nurse practitioners and approval of educational programs for an interim period of three years by a policymaking body, including physicians and nurses, and suggests that "the Advisory Committee on Physician's Assistant and Nurse Practitioner programs is ideally suited to such a task."

Despite the absence of nurse practitioner licensure or certification, the report points out several things: that there are approximately 690 graduates or prospective graduates in California (120 family nurse practitioners (NP), 249 pediatric NPs, 140 adult NPs, 72 Obstetric-Gynecologic NPs, 89 family planning specialists; and 20 psychiatric/mental health NPs; was able to identify approximately 476 nurse practitioners in "educational programs" in California in 1973 (165 students at the University of California, 32 at state colleges and universities, 12 at private medical schools, and 267 at health care institutions, primarily Kaiser-Permanente 173); and states that many nurses with this training are practicing throughout California. Moreover, many of the training programs have been supported with federal funds. Thus the need for expanded role nursing was perceived by educational institutions, students, and employers who were willing to take the risk of sanction for unauthorized practice to fulfill the apparent need.

The Report of the Advisory Committee defines a nurse practitioner as "a licensed nurse who has acquired additional medical knowledge and

skills in order to gather data, make hypotheses, identify problems, implement management and evaluate the results in consultation with a licensed physician and surgeon." Such medical functions are to be under the direction of a physician who is immediately available for consultation "either personally or through electronic means." The report recommends that nurse practitioners be recruited from rural or inner city areas and be encouraged to function in these areas. The role of the nurse practitioner is differentiated from that of a physician's assistant in that the nurse practices under her own license but consults with a physician who retains final medical responsibility for the patient. Specific approval of the physician to supervise the nurse practitioner is not required as it is with PAs. Tasks performed by the physician's assistant are essentially medical in nature, as opposed to the nurse practitioner who performs both medical and nursing tasks.\footnote{102}

If the practice recommendations of the Advisory Committee are accepted, it appears that nurse practitioners will have a broader scope of practice than physician's assistants because of their nursing license and will be able to operate in hospital settings and alone as long as a physician is available for consultation. Physicians have been accustomed to working with the supervising nurses, many of whom for years have been undertaking delegated medical functions. It would appear physician acceptance of the nurse practitioner role may be easier to gain than their acceptance of physician's assistants. Assembly Bill 3187 introduced in the Legislature would establish a separate council to license nurse practitioners composed of an equal number of physicians and nurses.

\textbf{Experimental Projects}

To promote innovation, the Legislature in 1972 authorized the State Health Department of exempt "experimental health manpower projects" from current licensure requirements. This legislation had three primary objectives:

\footnote{102}{Ibid., p. 13.}
1. To encourage experimentation by removing legal barriers to it (i.e., questions about the legality of training programs and the legal status of trainees themselves).

2. To assess more systematically the need for new or expanded roles and evaluate program results.

3. To develop suggestions for reform of licensure laws that flowed from the experience of the projects themselves.

Specifically, projects sponsored by nonprofit educational institutions, hospitals or clinics are to be approved for expanded role medical auxiliaries, nurses, dentists, and personnel in maternal child care, pharmacy, and mental health.

Thus under existing legislation nurse practitioner training programs can already be approved by the Health Department and no legislation appears to be required to accomplish this, despite the fact that the Report of the Nurse Practitioner Advisory Committee says "there is no ready mechanism for evaluation and validation of proposed nurse practitioner training programs." There is a more important need for specific action allowing training program graduates to practice in the state. While AB 1503 may be interpreted to allow such practice under limited conditions, a more definitive solution is necessary so these graduates will be able to practice, at least temporarily, while a longer term solution is developed. Lack of action will make it difficult for nurse practitioner graduates to find jobs because hospitals and others are unwilling to take the risks involved in hiring them. It would appear that recommendations for licensing nurse practitioners after an interim period could be developed either by a new body or by the Health Department utilizing experience and evaluation of designated "experimental health manpower projects." The Health Department, as of March 1, 1974, has approved approximately 30 nurse practitioner training programs under this legislation.
Institutional Licensure

In addition to changes in licensure methods for specific categories of health personnel, suggestions have been made for "institutional licensure." Under this approach, advocated by professor Nathan Hershey of the University of Pittsburgh, health personnel licensing would be integrated with the present system of facility licensure. Under this proposal only health institutions (e.g., hospitals, nursing homes, physicians' offices, and clinics) would be directly regulated by the state and would have to meet "objective criteria relating to the safe and competent performance."

The state agency "would establish illustrative job descriptions for various health institutional positions" as guidance to health institutions that would develop and periodically submit to the state agency a plan for selection and utilization of staff including job classifications. The state agency would be concerned with an institution's personnel practices in designing job categories and qualifications and in assessing performance. Under this proposal, the state agency would be composed of public members assisted by advisory panels concerned with specific professions; an individual would have to meet the institution's job related education, experience, and performance requirements for a particular position; and institutions would be subject to fines, suspension or revocation of state funds or operating license.

Hershey claims superiority for institutional licensure in accountability to the public, responsiveness to changing conditions, and improved opportunities for health personnel. Several forms of institutional licensure are possible: it could cover all practitioners or only certain classes, e.g., all but physicians; or all but physicians and nurses; or it could be applied to selected institutions, e.g., hospitals, clinics, nursing homes, and health maintenance organizations.

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Although attractive in concept, this approach may have a variety of operational problems. If each institution were to develop its own job classification and training system, confusion could result and there might be a negative effect on mobility between institutions and individual career viability. At a recent conference on licensure alternatives, Dr. Jerome Lysaught, Director of the National Commission for the Study of Nursing, suggested that focus on such reforms as "institutional licensure" as a "panacea" simply detracts from the consideration of more basic issues of supply and quality, which he considered to be poor labor force participation resulting from poor salaries, working conditions, and lack of job satisfaction. In his view, a more basic question is how to restructure the health care industry, which bases its management principles on the Frederick Taylor School of Scientific Management, into a different pattern with a personnel system that is more compatible with basic human needs.\(^{104}\) He did, however, favor more study and experimentation of the institutional licensure concept. To deal with various problems presented by this approach, further documentation and experimentation is necessary.

With HEW support, an institutional licensure demonstration program is being planned involving a number of Pennsylvania hospitals. In California, the Hospital Association has been interested in this approach and has requested federal funds to study alternative training and educational requirements that could be imposed upon technical personnel employed by hospitals. A major concern of California hospitals is increasing pressure for separate licensure by many developing technical classifications and the resulting fragmentation of training and certification programs.

Illinois' Rush-Presbyterian-St. Luke's Medical Center is now conducting a project involving 19 hospitals to test the feasibility of utilizing in-house credentialing for allied health personnel. A

\(^{104}\)Presentation by Dr. J. Lysaught, California Hospital Association Conference on Licensure of Health Personnel, September 14, 1973.
progress report on this project noted that 60 percent of such personnel for all 19 hospitals had no formal credential and that there was relatively little agreement on tasks performed by personnel carrying similar titles. 105

A Massachusetts study proposed creation of a new career ladder consisting of a progression of paramedical occupations structured around nursing and medicine. An individual would progress from nurse aide to nursing assistant or medical assistant to physician's assistant based upon experience and on-the-job training. 106

Dr. Roemer has proposed a health team licensure system in which the head of the team would be licensed and authorized to supervise certain unlicensed personnel on his team in accordance with patient care criteria. 107

IMPROVE REGULATION OF QUALITY BEYOND ENTRANCE

Various groups have expressed concern about the fact that licenses are generally granted for a lifetime, with no renewal requirements to provide assurance that an individual was competent to practice. The National Advisory Commission on Health Manpower called for continuing education or passage of specialty challenge exams as a basis for relicensure.

The National Board of Medical Examiners' Committee on Goals and Priorities recommended three types of qualifying exams at three points in what they called "the continuum" of medical education. The Qualifying A Exam would attest that the medical school graduate is competent to assume responsibility for patient care under supervision (i.e., a residency program) and would be required for entrance into a graduate medical education program. The Qualifying B Exam would be


107 K. Roemer, "Licensing and Regulation of Medical and Medical Related Practitioners in Health Service Teams," Medical Care, Vol. 9, January-February 1971, pp. 42-54.
given after formal graduate medical education and would attest that
the graduate is competent to assume responsibility for independent
medical practice. Passage of this specialty exam would be required
by a licensing board for an unrestricted license to independent
practice. The Qualifying C Exam would form the basis for periodic
recertification and relicensure.

The major differences between the committee's recommendations
and the present system are that currently a medical school graduate
may be given a full license for independent practice, specialty
certification is not required for independent practice, and no general
requirement exists for periodic reevaluation of continued competence. ¹⁰⁸

The committee concluded that

examinations for certification should not be designed
or used to confirm what educational objectives have been
achieved... Instead, evaluation for certification must
validate that the individual...is competent to assume new
responsibilities for patient care based upon performance
criteria.¹⁰⁹

The committee determined that 89 percent of the graduates from
1960 and 1964 classes had residency training and that with family
practice as an established specialty almost all graduates will probably
receive specialty certification in the future. In recognition of
this fact and to assure that independent practice is based upon greater
demonstration of competence, the committee recommended specialty
licensure. The Chairman of the National Board of Medical Examiners
has requested that

the state boards, on a state-by-state basis will take
whatever legislative and regulatory steps may be needed to
recognize specialty certification as an appropriate

¹⁰⁸ New Mexico requires participation in continuing education as
a requirement for periodic relicensure, and Kansas and Maryland enable
Medical Boards to do the same.
¹⁰⁹ National Board of Medical Examiners, Goals and Priorities,
pp. 24-25.
qualification for a license to practice medicine without institutional supervision.\footnote{110}

Hearings by the Assembly Select Committee on Health Manpower were held recently in specialty licensure. Based on these hearings, legislation has been introduced that would provide for it (AB 3041, Duffy).

Recent California legislation would have required registered and vocational nurses to show evidence of continuing education as a condition for 1976 relicensure. Because of legislative concern about the practical implementation of this requirement and doubts about its benefits, legislation has been introduced to eliminate this requirement (AB 3017, Duffy). Regardless of the disposition of this legislation, more systematic analysis of the costs and benefits to the individual and the state of alternative mandatory continuing education is necessary. A cooperative study by the Post-secondary Education Commission, the Licensure Boards, and the Health Department could help clarify policy alternatives available to the legislature in this field.

**TO FACILITATE IMPROVED GEOGRAPHIC AND SPECIALTY DISTRIBUTION**

According to the Goals and Priorities Report of the National Board of Medical Examiners:

Perhaps more critical than the number of physicians is the failure within the system to regulate type and number of specialists, their geographic locations, and practice patterns. No single agency has yet accepted responsibility for determining the type and number of specialists needed...current licensing arrangements provide the states with little means of regulating the type of practitioner or his location.\footnote{111}


\footnote{111} National Board of Medical Examiners, \textit{Goals and Priorities}, pp. 10-11.
The report also pointed out that

Despite the widespread acceptance of specialty board certification by hospital staffs and trustees, federal and state agencies, and many professional organizations, most states continue to provide the physician with an unrestricted license to practice medicine after one year of post M.D. education.

They recommended that specialty boards continue to certify competency but that this "should be requisite for, but not a guarantee of, licensure," which would still be a state responsibility, and that "through legislative acts, state authorities may influence selectively the type of physicians licensed." 112

Thus while recognizing that no agency currently is responsible for regulating specialty or geographic distribution, specialty licensure would clearly be a method of doing so.

The University of California has noted that, "Additional licensing or franchising by the state could be required for practice in those specialties or subspecialties determined to be over-supplied." The University concludes, however, that

this approach would be dangerous for the state. An already trained specialist who might migrate to California is less likely to do so if required to change fields in order to practice here. We believe that many recent M.D. graduates are influenced more by a desire to practice a particular specialty than to practice in a particular geographic area. Loss from emigration as well as from decreased immigration might cause more damage to California's physician supply than would be gained by this approach to control of over-supplied specialty fields. 113

Clearly, licensure based upon societal need for services by specialty or geography as a method of influencing distribution of services deserves further study. Certainly such regulation has

112 Ibid., p. 55.
113 University of California, Primary Care Services Report to the Legislature, p. 15.
constitutional implications. Moreover, the potential effects of such regulation are not well understood. However, to the extent that existing institutions are not responsive to societal needs, pressures will increase for regulatory approaches that will correct perceived inequities.

TO FACILITATE GEOGRAPHIC MOBILITY

Inasmuch as California has attracted health personnel from other states, national actions or actions by other states that remove restrictions on geographic mobility could benefit this state. Clearly, national examinations in medicine and nursing have eased interstate mobility. But when mobility constraints are removed, there is no guarantee that health personnel will locate where they are most needed and thus such actions may negatively affect health service distribution.

EVOLVE A FLEXIBLE SYSTEM RESPONSIVE TO CHANGE AND PATIENT CARE REQUIREMENTS

Recent trends indicate that changes are occurring which, perhaps, will result in a less rigid structure of legal regulation. As tasks and roles continue to evolve, a flexible system that allows for greater mobility, innovation, and evaluation of performance rather than judging solely on formal qualifications may allow more productive allocation of manpower resources.

A variety of measures have been suggested to make licensure systems more accountable to the public, more flexible, and more effective in regulating quality and distribution. It appears, however, that little empirical work has been done either to determine the impact of licensure regulation on the behavior of health professionals or to assess the potential impact of major changes.

AB 1503, authorizing experimental manpower projects, is an important step in this direction. But it appears that longer range licensure reform policy alternatives should be subjected to critical review while further research and experimental efforts are undertaken. A more systematic review of licensure reform alternatives might well be undertaken as part of updating the State Plan for Health. Any
review should involve the cooperation of professional groups that have high interest and impact on licensure regulation as well as consumer and provider representation.
VI. A STRUCTURE FOR HEALTH MANPOWER PROGRAMMING

This report has illustrated the limitations of long-range health manpower policy planning, which is governed by major uncertainties: imprecision in our ability to project future demand and delivery system changes; lack of consensus on health goals or criteria for determining manpower "need"; lack of acceptable output measures (i.e., impact of services on health status) or understanding of health production functions (i.e., the most effective resource combination to produce health outputs); and inability to predict specifically the effect of policy actions.

Given these uncertainties, an appropriate strategy for state health manpower policy analysis would stress a flexible planning approach to emerging issues and problems, explicitly recognizing these uncertainties while concentrating on intermediate run measures that seek to manipulate policy instruments over which the state has some control to achieve desired objectives. These instruments include measures that affect the education and training of health professionals, their licensure, the distribution of facilities and services, financing, and related actions that influence service delivery. Such a strategy accepts the difficulty of precisely determining the impact of changes in technology and institutions over which the state may have limited control. It argues for more clearly identifying national and state trends and concentrating on the range of actions that might influence those trends for the next five to ten years. It means examining trends in the aggregate supply and distribution of the full range of health manpower in relation to changing and alternative forms of service delivery. More specifically, it means tracking supply statewide and distribution within the state; through research and experimentation, identifying changes in delivery patterns likely to improve productivity and their manpower implications; determining state objectives, recognizing the subjective and political nature of this process and utilizing the full range of policy instruments available to the state to achieve these objectives.
But this approach is not an argument for abdication of responsibility to tackle the more difficult long-range problems that remain—a search for definition of goals, most effective production functions, and "optimal" means of organizing and delivery care. "Intellectually and for the purposes of long run improvement of health care, this kind of planning may be the most important to carry out. More harm than good may be done, however, by planning for the shorter term (5 to 10 years), which assumes or promotes large-scale changes that do not actually take place or are not well founded.

HEALTH MANPOWER GOALS

One major problem in the health care field is confusion and lack of consensus about goals. To illustrate the range of state activities that impacted on health manpower, we began this report with a hypothetical statement of health manpower goals. If goals are not clearly stated by those with public responsibility, efforts to achieve diverse objectives are difficult to assess and future impacts are almost impossible to predict. To the extent that the state fails to grapple with methods to define and implement its goals, planning can have only limited impact.

A major substantive question underlying goal determination is the relative value of increases in expenditures for medical care as opposed to other alternatives that may have greater impact on improving health status. Walter McNERNEY, in the New England Journal of Medicine, said:

It is not too strong to state that the present health system has relatively little to do with health and that it is tangential to many health problems...and if our society's concern were truly with health (that is, postponement of death and preservation of maximum function), we could achieve gains much more effectively than by pouring money into the health-care system. We would develop as national goals, for example, the following: elimination of cigarette smoking or development of a non-hazardous substitute.

114 Acton and Levine, p. 5.
development and promotion of foods low in sucrose and saturated animal fats; and regulation of diet to keep body fat low; regular, vigorous, physician-supervised exercise for all age groups; production of motor vehicles capable of withstanding 35 g or better decelerative forces; and better control of air pollution.\textsuperscript{115}

Stewart and Siddayao point out:

There are competing demands for resources that contribute in other ways to national well being—education, transportation, housing, food, working conditions, level of income... It might be possible that the low level of health in some areas of the nation may be the result not of a shortage of doctors but of a shortage of income or of education in good health habits.\textsuperscript{116}

Greater experimental emphasis on demonstrating the effectiveness of specific methods to improve health that do not involve increase or expenditures for traditional medical care could have significant results which, if applied generally, could reduce the need for traditionally trained health manpower categories. Moreover, to the extent that medical care activities have limited health impact, and are still demanded by the public, they might just as well be provided by less trained and hopefully less expensive paramedical personnel.

The California State Plan for Health developed in 1971 represents a significant first step to develop goals, to collect manpower information from a variety of sources, and to make recommendations for policy changes. The plan, however, gives little attention to implementation. Even though it was developed with extensive participation of consumers and producers of health services, no suggestions were made for a process to gain acceptance, modification or otherwise mold consensus for its recommendations. Little attention was paid to institutional arrangements necessary to implement them. Now, with the creation of


\textsuperscript{116}Stewart and Siddayao, p. 59.
a unified Health Department, updating of that plan can take place within an administrative structure responsible for coordinating all health related programs within the Executive Branch. Even with a single Health Department there are still several major missing links to creating a viable planning and programming structure for health manpower. Such a structure requires:

- Involvement of higher educational institutions.
- Participation of licensure boards.
- Greater attention by comprehensive planning agencies to manpower requirements.\textsuperscript{117}
- A framework for coordinated data collection and analysis.
- Appropriate Department of Finance legislative involvement.
- Integration of manpower with facilities and services planning.

Moreover, new institutional arrangements are necessary to both the development and implementation of state health manpower policy.

**FRAGMENTATION OF HEALTH MANPOWER ACTIVITIES**

Responsibility for health manpower planning and programming is currently fragmented. Other than through the Comprehensive Health Planning program and action by the Legislature, no structure exists for coordinating these activities or for raising policy issues that cut across the jurisdiction of training institutions, state departments and agencies. Table 32 illustrates the units of state government concerned with health manpower activities.\textsuperscript{118}

\textsuperscript{117} According to staff of the State Comprehensive Planning Program and the California Regional Medical Program, a major limitation of the present comprehensive health planning program is a relative lack of concern with manpower planning at both the state and the regional level. Clear federal and state mandates call for development of facilities and services plans, but manpower considerations receive relatively little attention.

\textsuperscript{118} A complete listing of all state programs concerned with health manpower would involve almost all health department activities inasmuch as their implementation involves development and training of personnel
<table>
<thead>
<tr>
<th>Training</th>
<th>Licence</th>
<th>Health Department Programs</th>
<th>Legislature</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of California</td>
<td>Department of Consumer Affairs (contains Healing Arts Licensure Boards, i.e., Board of Medical Examiners, Board of Nurse Education and Nurse Registration, etc., Health Department--personnel and facility licensure activities).</td>
<td>Health Quality Systems</td>
<td>Assembly Select Committee on Health Manpower</td>
</tr>
<tr>
<td>State colleges and universities</td>
<td></td>
<td>1. Comprehensive Health Planning Program (develops state plan for health and works with area planning groups). Contains Health Manpower Section which administers AB 1503 (authorizes experimental Health Manpower projects) and is to &quot;develop and advance a health manpower action policy and program.&quot;</td>
<td>Joint Legislative Committee on Siting of Teaching Hospital</td>
</tr>
<tr>
<td>Postsecondary Education Commission (state higher education planning and coordinating agency)</td>
<td></td>
<td>2. Licensing and Certification Program (licenses and approves facilities and services).</td>
<td>Assembly Health Committee</td>
</tr>
<tr>
<td>State Scholarship and Loan Commission (administers medical contract program of aid to private schools)</td>
<td></td>
<td>3. Functional Task Analysis Project (health manpower utilization study--analysis of tasks performed by various health personnel).</td>
<td>Senate Business and Professional Committee</td>
</tr>
<tr>
<td>Health and Welfare Agency (administers contract program for establishing family practice and physician's assistant training programs at public or private schools).</td>
<td>Health Administrative Systems (Manpower Development and Training Section--explores and develops manpower resources and provides training for state and local staff. Administers AB 168--calls for development of plan for &quot;innovative&quot; training programs).</td>
<td>Other programs: Family Health Services, Emergency Medical Services, Mental Health and Developmental Disabilities, etc.</td>
<td></td>
</tr>
<tr>
<td>Health Department</td>
<td></td>
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<tr>
<td>Health Treatment Systems (manpower development and training for mental health and developmental disabilities program)</td>
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<tr>
<td>Health Quality Systems (health planning program including administration of AB 168).</td>
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<tr>
<td>Health Administrative Systems (manpower development and training section administers AB 168).</td>
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</tbody>
</table>

**SOURCE:** State Budget, Departmental Organization Charts, and Functional Description.

*Under current legislation the Healing Arts Boards will become part of the Health Department in 1977.*
Recent legislation illustrates the trend of state actions impacting on training institutions:

- 1970 legislation set up an Advisory Committee to the State Board of Medical Examiners to set education guidelines for physician's assistant training.

- 1971 legislation provided funds to the State Scholarship and Loan Commission for contracts with private medical schools to provide funds to increase their M.D. enrollment.

- 1972 legislation authorized the Health Department to designate experimental health manpower training projects that would be exempt from state licensure laws. This program is administered by the Comprehensive Planning Program of the Health Quality System that also has been given responsibility for developing "a health manpower action policy for the department."

- 1972 legislation mandated the Health Department to survey those with plans for "innovative" training programs and to prepare a financial plan for the Legislature for State funding of some of them.

Interestingly, responsibility for administering AB 168 was housed by the Health Department in the Administrative Services Systems while AB 1503, a related program, and other manpower planning and programming responsibilities are carried out by Comprehensive Health Planning.

needed to perform functions to implement state programs or meet health needs of state citizens. Our listing only includes those Health Department programs that appear to have a significant role in administering training programs or regulating manpower utilization.
• 1973 legislation provided $3 million to the Health and Welfare Agency for grants to medical schools for establishing family practice and physician's assistant program. 119

• 1973 legislation set up the new Postsecondary Education Commission with broad responsibilities to coordinate higher education planning. It replaced the Coordinating Council on Higher Education.

These new programs have placed functional responsibility for health manpower training programs in the hands of various governmental units with no necessary coordination or cooperative planning.

HEALTH SCIENCE EDUCATION PLANNING

The development of institutional arrangements and policies encouraging closer interface between health sciences education and the health delivery system have been called for by both the Carnegie Commission and the State Plan for Health. 120

The State Plan for Health concluded:

No central planning facility exists for matching the resources of the state's higher education system to the state's health manpower needs, or for reviewing differences in the content of various training programs for the same occupation, or for assisting in the arrangement of inter-institutional agreements, for deciding what roles are appropriate for the institutions involved, and helping to administer related fiscal arrangements. 121

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119. The Health and Welfare Agency includes the Departments of Rehabilitation, Health, Employment Development, Benefit Payments, Corrections and Youth Authority. The Secretary reports directly to the Governor, and his Office contains the Office of Education Liaison that will administer this program.

120. Carnegie Commission.

Health sciences education planning concerns not only the three segments of public higher education in California—the University of California, the state universities and colleges, and the community colleges—but also interrelationships between private and public educational institutions. If state goals are to be achieved most effectively, the resources of all training institutions and the relative benefits of alternative training programs at these institutions should be considered and evaluated.

Within the public sector, the University of California notes that, "The need for a new specific plan for increasing integration and interaction between the University's medical school programs and the premedical programs of the California State Universities and Colleges has been recognized for some time." 122

Fresno is a specific geographic area that is a candidate for cooperative efforts. The Carnegie Commission recommended that Fresno be the city for one of its nine recommended new health science centers. The recommendation was based upon the commission's conclusion that a center should be located in every metropolitan area with a population of 350,000 or more, except for those areas geographically convenient to an existing center. Fresno is located in the heart of California's predominantly rural San Joaquin Valley and in an area that has a state university but not a proximate University of California campus. The California Master Plan for Higher Education precludes the state universities and colleges from offering professional degree programs. While U.C. indicates it is examining possible cooperative arrangements, it notes that "no definite plans have been made and further planning in Fresno or elsewhere will require extensive discussions with the appropriate State University or College." While formation of consortia involving higher educational institutions and providers on a regional

122 University of California, Primary Care Services Report to the Legislature, p. 24.
basis encouraged through Regional Medical Programs have been formed, U.C. points out that "expansion of these programs has been limited because generally clinical training costs have not been recognized in the budgets of either the affiliated institution or the University."

In nursing education, problems of articulation exist between community and state college programs. A memorandum prepared for the Community College Board of Governors pointed out that "little research has been done to show the differences and similarities in the nursing education at both levels,"¹²³ and stressed the need "to examine, define and differentiate the levels of function, basic preparation and responsibility designated for each category."

Major problems in nursing education concern not only the articulation of programs within schools, but also the scope of tasks defined by licensure laws and regulations that impact both on scope of function and educational requirements.

All of the healing arts licensure boards impact significantly on health sciences education because of their authority to approve educational programs as a basis for licensure. Thus a structure to improve health sciences educational planning should involve participation of the relevant licensure boards.

From the viewpoint of the state, what objectives could be achieved by improved interface between health sciences education and health services planning? The following is a suggested list:

1. Relate the activities and resources of all educational institutions to health manpower goals articulated by the state, i.e., emphasis on primary care and distributional improvements.
2. Encourage improved allocation of state resources to meet these goals.
3. Through planning, improve communication between higher educational institutions, and between these institutions

¹²³ Board of Governors of California Community Colleges, Nursing Education Agenda Item 19, September 1972.
and health providers, regulatory boards and consumers on a statewide as well as a regional basis so that these resources can better direct their efforts to fulfilling state goals.

4. Inventory and assess health sciences education programs to both monitor activities of training institutions and determine the need for new or continued programs.

5. Develop a method to determine (1) appropriate training for various types of personnel and (2) which educational institutions might best perform it.

6. Establish a framework for improved interinstitutional arrangements including guidelines and fiscal arrangements.

7. Relate training programs to future health needs and encourage experimentation and innovation in educational programs.

8. Relate training programs to career opportunities of greatest benefit to students.

These objectives might be implemented through four alternative institutional arrangements.

1. Mandate the new Postsecondary Education Commission to develop a Health Sciences Education Plan to be updated regularly and submitted to the Governor and the Legislature.

This commission has replaced the Coordinating Council for Higher Education and was intended by the Legislature to have broader authority and greater independence from existing higher educational institutions than its predecessor. The new commission "in its capacity as the statewide postsecondary education planning and coordinating agency and advisor to the Legislature and Governor," will receive institutional and systematic long-term plans from the higher education segments and prepare a five-year plan integrating planning within the segments, seek to resolve conflicts, and report unresolved problems to the Governor and the Legislature. It also advises, as requested, on whether segment budgets are compatible with the state plan, reviews new programs and the need for location of new institutions and campuses.
While the present character and detailed scope and impact of the new Commission's role are unclear at this time, it does appear to have significant "leverage" over the programs of educational institutions and was established to promote responsiveness by educational institutions "to student and societal needs through planning and coordination."

The Health Sciences Education Plan would be developed to meet the goals of the State Plan for Health that should set targets for manpower needed to meet state objectives. It would serve as a basis for Commission evaluation of academic plans, educational programs, and budgets of the state's higher educational institutions.

The planning process envisioned would result in a statement by the commission on both short- and long-term general and specific goals based upon the State Plan for Health and anticipated health system trends. The plan would contain a statement identifying the assumptions upon which future trends and goals were based. It would generally describe the responsibilities of various higher education segments.

The plan would be developed by an advisory committee to the commission, composed of representatives of the State Department of Health, the Legislature, the healing arts licensing boards, health providers and consumers, and would be assisted by the State Comprehensive Health Planning Staff and others, including outside consultants if the committee desired them. Each segment of higher education would develop its own plan proposals based upon guidelines established by the committee, but the committee would be free to develop its own plan for submission to the full commission. The commission would also be assisted by regional consortia composed of educational institutions, providers and consumer groups, and regional comprehensive planning agencies. Through available state resources, it would collect data on employment trends and opportunities for health professionals as a basis for its planning effort and student counseling.

New Jersey, through its Department of Education, has developed a Health Professions Education Master Plan for that state as part of its ongoing mandate to develop master plans for higher education generally. Its master plan was adopted in May 1973. The staff of comprehensive
planning A and B Agencies all participate actively in the planning activities presently under way in the Office of Health Professions Education. To advise the Chancellor and the Board of Higher Education, a Health Professions Education Advisory Council was created. No program approvals and policy recommendations in the health professions field will be considered by the Board of Higher Education unless accompanied by an advisory opinion from the council. The council also must approve proposals to establish any new schools, departments or divisions in the allied health field by any higher education institution. The 16 member council is composed of representatives of public and private colleges, State Comprehensive Health Planning, the Department of Education, the New Jersey Hospital Association, and the community. The Master Plan made the following major recommendations:

- Investigate alternative structure of health care teams to determine ways this approach can be integrated into the educational process.
- Involve higher educational institutions more directly in the development of criteria governing credentialing, accreditation, licensing, and certification.
- Create planning regions corresponding to state comprehensive planning areas and develop a "regional approach" offering opportunity for basic and continuing education, the most effective use of available resources through sharing of both faculty and clinical resources.

While it is still too early to assess the impact of the New Jersey Master Plan, it has interesting elements that may apply to

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California. A potential limitation of such a commission is that it may not place high enough priority on relating educational programming to the state's health needs.

2. Mandate the Health and Welfare Agency to Develop the Plan for Submission to the Postsecondary Education Commission, the Governor, and the Legislature.

Recent legislation establishes a Health Manpower Policy Commission to administer the Song-Brown Family Physician Training Act of 1973. This commission will establish criteria and procedures to allocate funds appropriated for contracts with public and private higher educational institutions to improve training programs for primary care physicians and physician's assistants. This commission could be reorganized and its functions expanded to include development of a Health Sciences Education Plan that would help guide the Postsecondary Commission and higher educational institutions in the state. The Health and Welfare Agency could be assisted by an advisory group composed of representatives from the Postsecondary Commission, higher educational institutions, the Legislature, licensure boards, and consumers.

3. Mandate the Health Department to develop the plan for submission to the Postsecondary Commission, the Governor, and the Legislature as part of the State Plan for Health.

4. Establish an independent commission that would develop a plan and make recommendations for how it could be implemented.

For each alternative we envision intensive participation by educational institutions, the Legislature, licensure boards, providers and consumers in the development of appropriate sections of the State Plan for Health bearing on health manpower concerns.

PLANNING AND ANALYSIS CAPABILITY

In addition to pointing out the lack of interface between health sciences planning and health sciences education, the State Plan for Health also said:

Accurate and useful data are a necessity in planning of health manpower. Although a number of agencies collect data in considerable quantity, the specification of kinds
of manpower data which are necessary to planning, coupled with systematic collection and analysis, has not occurred. In order to insure success, this function will have to be undertaken by those who plan for health.\textsuperscript{126}

Presently, no state agency has a major continuing responsibility for systematically collecting and disseminating data required for manpower planning and analysis by a variety of potential state, local government, and educational institutions. The need for meaningful data and tools of analysis is mounting because a variety of governmental units are demanding them to meet their own program of responsibilities. This need will be magnified even more if the State Plan for Health is to be useful.

State and regional comprehensive health planning agencies have recently expressed interest in working together to develop a common framework for data collection and improvements in methodology that would improve state and local analytic capability. Proposals have also emanated from the Committee on California Regional Medical Programs through its health consortia, the State College and University System, and the University of California to improve their data collection and manpower planning capability.\textsuperscript{127} Such efforts should be encouraged as part of a unified system designed to assist the state as well as educational institutions and regional bodies in improving planning efforts.

Based upon our review of state manpower planning activities and manpower problems facing the state, we conclude that there is need for a focal point in state government to monitor health manpower trends systematically, coordinate the development of a statewide manpower intelligence system, and collect and disseminate information required by a variety of current and potential users. Such responsibility should most logically be placed in the Comprehensive Health Planning Program of the Health Department and should be an integral

\textsuperscript{126} California Department of Public Health, State Plan for Health, p. 231.

\textsuperscript{127} Author discussion with State Comprehensive Planning Staff, January 1974.
part of its total information gathering and planning effort to develop the State Plan for Health. To take leadership in this field, which will be essential to avoid continued fragmentation of information sources and waste of resources, the Health Department must develop the technical capability to manage such a program on an ongoing basis. In addition, an advisory group composed of those who would supply and use such data should be established to assist in designing and implementing an appropriate system. Membership in such a group could include representatives of higher education, licensure boards, professional associations, planning units, and appropriate operating units.

To accomplish these objectives, the advisory group should serve and be responsible to the Director of Health as part of the State's Comprehensive Health Planning activity concerned with developing and analyzing health policy alternatives, and designing and implementing the State Plan for Health. 128

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128 The Office of Comprehensive Health Planning formerly existed in the State Department of Public Health and reported to the Director. After the new Health Department was created out of the merger of Public Health, Mental Hygiene, Health Care Services Department plus functions of other departments, the Comprehensive Planning function was placed in the Health Quality System. Thus, from a Staff Office reporting to the Director, it was downgraded to a subunit within a specific branch of the department.
VII. CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

How many physicians do we need, want, demand? No consensus exists on how best to estimate manpower requirements. Projections have been made based upon professional criteria, practice in prepaid systems, physician to population ratios, and health system models. Forecasts are heavily laden with subjective inputs because the selection of a specific methodology or set of assumptions conditions the results drastically. No satisfactory measures exist regarding the impact of health services on the health status of individuals, and changes in technology and the health delivery system make long-range forecasts extremely suspect. Thus, projections of manpower requirements are beset with considerable uncertainty. Estimating manpower requirements for a particular state becomes even more hazardous because these must account for locational preferences of individual practitioners.

These uncertainties argue for a flexible planning approach on the part of the state, one that concentrates on intermediate run measures for manipulating the policy instruments over which the state has some control and on appropriately influencing federal policies. They require examination of manpower trends and requirements in relation to changing and alternative forms of health service delivery.

Trends in California and the nation indicate that the supply of physicians has been increasing rapidly while population growth has been modest and, if educational expansion and migration trends that substantially benefit California continue, this state should realize continued physician growth. However, migration must be very carefully monitored along with policies of the federal government, i.e., national health insurance, other states, and educational institutions that may affect supply and locational patterns.

Current supply trends raise questions about the state's need to support further expansion of educational programs aimed at continually
increasing the aggregate supply of physicians. Moreover, many conclude that increasing the supply of physicians will merely procreate the weaknesses of the present delivery system and discourage improvements in productivity that would reduce manpower requirements. "The major problem we face is not numbers; it is to use manpower properly."\(^{129}\) Inasmuch as physicians condition the demand for their own services, aggregate supply increase may lead to higher prices and poor distribution of services. However, it should also be noted that if some form of national health insurance is enacted, the demand for physician services will most likely increase.

Professional authorities appear to generally agree (1) that both the nation and California suffer from maldistribution of service delivery because physicians tend to locate in urban growth areas and not in rural areas; (2) that increased specialization has resulted in inadequate numbers of primary care physicians (e.g., family practitioners, internists, pediatricians, obstetricians, and gynecologists); and (3) that action is required to correct this imbalance. Application of professional criteria and practice of prepaid health plans would indicate that additional primary care physicians are needed, while certain specialties, particularly orthopedics, are overpopulated.

Criteria for geographic distribution are more difficult to apply. Major metropolitan areas have much higher physician to population ratios than other geographic areas, but it would be erroneous to assume that all areas of the state should have the same physician to population ratio. Certain specialties require a large population base that a rural setting cannot provide. Geographic distribution of primary care physicians in California is much more equitable than for all physicians. But particular areas of the state, namely Bakersfield and the Imperial and San Joaquin Valleys, appear to have the greatest physician supply deficiency because they rank low in ratios to population for both primary care and total physicians.

\(^{129}\) McNerney, p. 1459.
Importantly, recent trends indicate that specialty and geographic distribution disparities exist despite increases in aggregate physician supply and growth in isolated rural areas. Although specialty and geographic distribution may improve if aggregate supply increases, support for substantial aggregate physician supply growth appears too high a price to pay for potential distributional benefits.

For nurses, market signs are appearing that bear validation and careful monitoring. Informal state surveys indicate that nurses in certain major metropolitan areas are experiencing difficulties in finding jobs, while nursing supply and education programs continue to expand, and migration from other states also continues relatively unabated.

Registered nurses are found predominantly in metropolitan areas while licensed vocational nurses are distributed much more in rural areas. A key element in determining the supply of nurses is their labor force participation rate--30 to 35 percent of California registered nurses are inactive as are about 23 percent of licensed vocational nurses. Surveys of nurses indicate that participation could most likely be improved by flexible working hours, refresher training, and availability of child care.

There are various educational routes to nursing and little analysis of differences in nurse performance as a result of these educational differences. Also it appears that a more substantial effort is required to relate nursing tasks to educational and licensure requirements. The State Health Department Functional Task Analysis study represents such an effort.

Medical education programs impact significantly on both the supply and distribution of physicians. Some authorities have concluded that medical schools have not been responsive enough to societal needs and should be influenced through resource allocation to produce more primary care physicians, and examine and demonstrate improved methods to deliver care, particularly in rural areas and central cities.
If a state considers it desirable to improve the delivery of primary care services, particularly in rural areas, aggregate expansion of undergraduate medical school output does not appear to be the most cost-effective method for doing so. As we have pointed out, physicians do not tend to locate in these areas because they are not professionally or otherwise attractive. A promising approach to improved delivery of primary care in underserved areas would emphasize the training of nurse practitioners and physician's assistants who already live in these areas and have commitments from physicians who want to hire them. Linkages of rural areas to academic medical centers through residency programs or location of such centers close to rural areas may help to attract and keep more medical manpower in areas of need.

California provides relatively little educational opportunity for its citizens in relation to its population and per capita income. The importance of providing this opportunity in relation to its cost and societal benefits must be balanced against other state needs competing for scarce resources.

Expansion and redirection of graduate medical education has a variety of benefits for the state. House staff positions help to attract physicians, and interns and residents who fill them provide a significant amount of patient care. Also the distribution of residencies by specialty may significantly determine future practice choice. Increasing the proportion of primary care specialty residences may help to solve certain distributional problems.

The location of academic health centers seem to be important for distribution of medical care. Thus, while it is difficult to justify expansion of undergraduate medical education to increase the aggregate supply of physicians, expansion of undergraduate and graduate programs in particular areas of need appears justified.

A question of major importance to the state is, what are the costs of medical education and who should pay them—the federal government, the state, students, patients, or third parties?

Academic medical centers are complex institutions that produce "joint products" simultaneously—teaching, research, and patient care.
Therefore, it is difficult to allocate costs on an unambiguous basis to each output. While the state supports the operating and capital budget of university medical schools, substantial costs are also borne by the federal government, patients, and other third-party payers. The state receives substantial benefits from health sciences research in that the federal government pays overhead on research grants and contracts to the state which offset the state budget and the budget of the Regents of the University of California to the extent that the state would ordinarily pay the operating expenses incurred. The federal government also subsidizes patient care through Medicare and Medicaid, and has provided capitation grants to encourage medical school expansion. Because it is not currently possible to identify costs objectively which should be allocated to various medical school outputs, it is difficult to determine objectively which costs the state should pay.

Despite these difficulties, the state must determine health objectives toward which the resources of educational institutions should be directed.

We anticipate that medical schools will come under increasing pressure to reduce education costs by the federal government, third-party payers, and prepaid health plans as well as by the state.

While there has been little empirical study of the impact of licensure laws and regulations on the behavior of health professionals, many studies have concluded that they stifle proper resource allocation, impede career mobility, and fail to improve the quality of care provided to the public.

Some licensure boards have strong ties to the professions they regulate, and professional protectionism propels a movement toward a legal definition of scope of practice and recognition through licensure. A variety of proposals have been made to reform licensure laws and regulations: create a single licensure system under a board of department that would contain a significant number of public representatives; consolidate existing boards; consolidate facility and personnel licensure into a system called "institutional licensure"; require
continuing education as a basis for relicensure; broaden the scope of practice to expand the roles of nurses, pharmacists, etc.; encourage experimental programs; make greater use of proficiency and equivalency exams; and license by specialties. We find that California's Physician's Assistant Law appears to have been narrowly construed resulting in few graduates and dissatisfaction with allowable scope of practice by physicians who use them.

If the state is to grapple meaningfully with complex health manpower problems, more systematic data collection is an absolute requirement. No central agency presently collects uniform information either on national and state trends influencing the distribution of manpower or on the characteristics and location of various health professionals. Current and future governmental responsibilities require that the state develop a framework for analysis with the assistance and cooperation of a variety of research, educational, and provider groups so that information and analytic tools useful to a variety of users can be made available.

We find that new institutional arrangements and organizational changes are necessary to develop and implement state health manpower objectives and policies.

RECOMMENDATIONS

As we have pointed out, manpower planning is closely interwoven with planning for facilities and services. Despite the complexity, uncertainty, and difficulties involved, it is necessary for the state to establish broad, flexible health objectives to provide a framework and guide for manpower planning and programming. An appropriate vehicle for establishing such a framework and guide is the State Plan for Health. However, much greater attention must be paid to analysis of implementation alternatives and development of processes to mold consensus for change among affected organizations and groups. To improve health manpower planning and programming we propose the following five recommendations:
1. To improve the interface between health sciences education and the health delivery system, we propose the following:

- The new Postsecondary Education Commission be mandated on a continuing basis to develop and update a Health Sciences Education Plan for the state that would serve as a guide for resource allocation to public and private educational institutions. Such a plan would be developed by an Advisory Committee to the Commission consisting of appropriate state health and finance officials, including representatives of licensure boards, providers, consumers, educational institutions, and existing regional health services consortia. It would contain specific proposals to implement its recommendations.

- Designees of the commission should help determine State Plan for Health manpower goals and recommendations. Specifically, the Health Sciences Education Plan would be based on the Advisory Committee's examination of:
  - Alternative ways updated State Health Plan objectives could be met;
  - Appropriate division of labor between various public and private systems and regions;
  - Alternative approaches to improve the distribution of care by specialty and region;
  - Methods to foster interinstitutional arrangements including financing;
  - Training requirements for various health tasks;
  - Design of educational programs to fit job opportunities and provide for career mobility;
  - Methods to counsel students appropriately;
  - Likely future delivery system trends and needs and their relationship to educational programs.

An alternative implementation method would be to either (1) mandate the Health and Welfare Agency or the Health Department to develop a health sciences education plan that would then serve as a basis for
actions by the Postsecondary Commission and in the budget process, or
(2) establish an independent commission to review the problem, develop
a plan, and recommend implementation steps.

2. The University of California should review the desirability
of increasing tuition at public medical schools, provided that liberal
loan and repayment systems are available. Inasmuch as increased
questions are being raised about the public benefits that flow from
aggregate expansion of undergraduate medical education while the
private benefits to individuals in terms of income, status, and pro-
fessional rewards are substantial, it appears that individual
beneficiaries should pay a large share of their medical education
costs. Such funds could be utilized to expand educational opportunities
for Californians.

3. A focal point in the Health Department is needed to monitor
manpower trends systematically, coordinate the development of a state-
wide manpower intelligence system, and collect information required
by a variety of current and potential users. An important part of this
effort would be to track developments in other states and in federal
programs (i.e., grants to medical schools, national health insurance)
which are likely to impact on California health manpower supply and
distribution. This monitoring function, which is critical to the
development and analysis of health policy alternatives, should be
part of the state's Comprehensive Health Planning program and serve
and be responsible to the Director of Health. To carry out this
mission, additional staffing will be required as will assistance from
research, educational, and other institutions.

An important step to aid the planning process would be to identify
"medical service areas" that can be utilized to analyze manpower
requirements on a regional basis. The definition of such areas should
take into account urban/rural differences, patterns of service,
availability of care and access to it.
4. In the field of licensure, the State Health Department should:
   o Study the desirability of creating a single personnel licensure system lodged with a board or a department, including the feasibility of implementing such a system.
   o Support consolidation of separate nursing boards with appropriate representation of the public, registered and vocational nurses, and educational institutions.
   o Encourage continued experimentation and pilot projects to utilize health personnel in new roles (e.g., physician's assistant, nurse practitioner, nurse midwife, and dental auxiliary) and in geographical areas of need and to assess the impact of these personnel on the medical care delivery system. Support specific legislation enacted authorizing nurse practitioners who graduate from approved programs to perform certain medical procedures alone under physician supervision.
   o Closely monitor demonstration projects aimed at testing institutional licensure and examine the feasibility of establishing such a demonstration in California.

5. In the field of nursing the State Health Department should:
   o Undertake surveys immediately to determine employment opportunities in nursing and specifically the extent to which such opportunities may be declining. Valid information is needed as soon as possible so that appropriate action can be taken to counsel students and develop appropriate measures to reduce planned expansion of training programs.
   o Undertake a comprehensive study in cooperation with the Postsecondary Commission and Nurse Licensure Boards and other appropriate agencies to evaluate the costs and benefits of alternative approaches to provide continuing education for the health professions.
Develop experimental and demonstration programs to encourage nurses to expand their labor force participation. Particular emphasis should be placed on flexible schedules, availability of part-time work, availability of child care and salary increases.
BIBLIOGRAPHY


______, Medical School Alumni, 1967.


Assembly Select Committee on Health Manpower, Transcript of Hearing on the "Medical School Needs of the San Joaquin Valley," Fresno, California, September 12, 1972.


Board of Governors of California Community Colleges, Nursing Education Agenda, Item 19, September 1973.


California Board of Nurse Education and Nurse Registration, Profile of Registered Nurses in California, 1970.

California Board of Vocational Nurse and Psychiatric Technician Examiners, Currently Licensed Vocational Nurses in California, July 1972.

California Department of Finance, Audits Division, Clinical Teaching Support, March 1973.


California Medical Association, Characteristics and Distribution of Physicians in California, June-July 1969, 2/19/70.

Vol. XII, No. 7, July-August 1972.


Governor's Budget 1972-73 through 1974-75, "Human Medicine Teaching Hospital and Organized Research Support."


________, Registered Nurses, 1970.

________, Survey of Health Manpower Employers to Determine Shortages, 1968.


Human Relations Agency, Report to the Secretary, February 1, 1970, "A Department of Health for California."


Joint Legislative Committee on the Siting of Teaching Hospitals, Recommendations Concerning a Prepaid Teaching Hospital at the University of California, Irvine, June 1, 1973.


Medical Care, Vol. 9, January-February 1971, "Licensing and Regulation of Medical and Medical Related Practitioners in Health Service Teams," pp. 42-54.


The New York City-Rand Institute, Survey of Inactive Nurses in New York City, April 1971, (unpublished).


Roemer, R., "Licensing and Regulation of Medical and Medical Related Practitioners in Health Service Teams," Medical Care, Vol. 9, January-February 1971, pp. 42-54.


University of California, University of California Budget for Current Operations, October 1973.


Office of the President, A Report to the Legislature on a Plan for Meeting the State's Needs for Primary Care Services and Physicians, Berkeley, January 1974.

University of California Regents Budget 1974-75.


Report of the Secretary's Committee to Study Extended Roles for Nurses, November 1971.


White, C. H., Ph.D., California Health Services Educational Activities Consortium Network, California Regional Medical Programs, Oakland.

Yett, D., and F. Sloan, Analysis of Migration Patterns of Recent Medical School Graduates, December 1971 (mimeographed).