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REPORT ON PRIMARY CARE WORKFORCE PROJECTIONS

**Council on
Graduate Medical Education**

**National Advisory Council on
Nurse Education & Practice**

December 1995



**U.S. Department of Health and Human Services
Health Resources and Services Administration
Bureau of Health Professions
Rockville, Maryland 20857**



JOINT STATEMENT

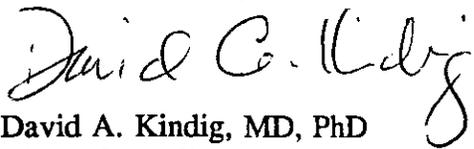
In September 1995, the Council on Graduate Medical Education (COGME) and the National Advisory Council on Nurse Education and Practice (NACNEP) held the first-ever joint meeting of the two Councils to consider and act upon the report and recommendations of the Joint Workgroup on Primary Care Workforce Projections. Previous to that meeting, each Council had carried out the work of examining the requirements for the medical and nursing workforce through the separate activities of the respective councils. The joint work of the two Councils on requirements for primary care providers has resulted in important advancements in approaches examining health professions workforce issues through an analytic lens that focuses beyond a single discipline. In addition, the joint work of the Councils, their historic meeting and the joint unanimous endorsement of the workgroup's findings and recommendations provides a model for interprofessional collaboration that can help to inform future work among professions.

The shared work of the two Councils was stimulated and guided by the longstanding interest of the Bureau of Health Professions (BHPr) of the Health Resources and Services Administration (HRSA) in developing analytic approaches to estimating the requirements for primary care providers in an integrated fashion. The Bureau was particularly interested in looking at primary care physicians (PCPs), nurse practitioners (NPs), physician assistants (PAs), and certified nurse-midwives (CNMs). The need for such an approach was recognized by each Council as it developed requirements projections for its own discipline. This mutual interest on the part of the BHPr and the two Councils resulted in the formation of the Joint Workgroup on Primary Care Workforce Projections. This group, whose members were drawn primarily from both Councils, was charged with the task of providing the two Councils and BHPr with advice on integrated primary care workforce requirements and overall issues relating to an interdisciplinary primary care workforce.

The focus of the Joint Workgroup's activity in the area of integrated workforce requirements consisted of advising on the development of a computer model to project requirements for an integrated workforce, which was accomplished through a BHPr contract with Vector Research, Inc. Specifically, the workgroup interfaced

with the contractor's staff, guiding the development of the assumptions for the model and providing feedback on the data and the model results. The second area of concern of the workgroup, issues related to an interdisciplinary primary care workforce, focused on two major subjects: (1) barriers and facilitators of collaboration among primary care providers, and (2) issues relating to professional territorialism and power.

At the joint meeting, COGME and NACNEP unanimously endorsed the findings and recommendations contained in the Joint Workgroup on Primary Care Workforce Projections report. The Councils recognize that the Federal Government has a significant role to play in national work force planning and development. Accordingly, the two Councils are presenting this report in anticipation of the contribution these findings and recommendations will make to the overall planning efforts for the nation's health care needs.



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Overview

In September, 1995, the first-ever joint meeting of the Council on Graduate Medical Education (COGME) and the National Advisory Council on Nurse Education and Practice (NACNEP) was held to consider and act upon the report and recommendations of the Joint Workgroup on Primary Care Workforce Projections. At this meeting, the report was accepted and its findings and recommendations unanimously endorsed by both Councils.

The Joint Workgroup on Primary Care Workforce Projections initially grew out of a longstanding interest on the part of the Bureau of Health Professions (BHPr) of the Health Resources and Services Administration (HRSA) in developing analytic approaches to facilitate estimating integrated workforce requirements for primary care providers, including primary care physicians (PCPs), nurse practitioners (NPs), physician assistants (PAs), and certified nurse midwives (CNMs). The Bureau's interest in this area was shared by both COGME and NACNEP, resulting in the formation of the Joint Workgroup on Primary Care Workforce Projections, whose task was to provide advice to the Bureau and the two Councils regarding integrated primary care workforce requirements and overall issues relating to an interdisciplinary primary care workforce.

The focus of the Joint Workgroup's activity in the area of integrated workforce requirements consisted of advising the development of a computer model to project requirements for an integrated workforce, which was accomplished through a contract awarded by the Bureau to Vector Research, Inc. Specifically, the Joint Workgroup interfaced with the contract staff, guiding the development of the assumptions for the model and providing feedback on the data and results.

The Joint Workgroup's second area of concern, issues relating to an interdisciplinary primary care workforce, focused on two major areas: (1) barriers and facilitators of collaboration among primary care providers, and (2) professional territorialism and power across disciplines.

The work of the Joint Workgroup began at its first of four meetings in October of 1994 and was completed in August of 1995, resulting in its report to the Bureau, COGME and NACNEP in September of 1995.

The Integrated Requirements Model

The integrated requirements model (IRM), developed with the advice of the Joint Workgroup, has the capacity to project national requirements for PCPs, PAs, NPs, and CNMs in the delivery of primary care through the year 2020 under a variety of scenarios. Conceptually, the model projects the number of those practitioners required to provide primary care services to the country's population in relation to the gender/age distribution of the population and the financial arrangements for payment.

The six scenarios below were developed to illustrate the model results and provide the basis for discussion of the overall model by the Joint Workgroup. These scenarios project requirements to the year 2005.

1. **Status quo**, which applies 1995 insurance distributions and staffing models to all projection years to measure the effects of changing U.S. population demographics
2. **Baseline insurance projection**, which incorporates estimated shifts in insurance coverage along with the shifts in the population demographics
3. **High managed care**, which shifts the population into HMO settings to a greater degree than in the baseline insurance projection
4. **Universal coverage**, which builds on the high managed care scenario but shifts the uninsured population into other insurance settings, particularly HMOs, and provides preventive services in all insurance settings
5. **Equal access under universal coverage**, which builds on the universal coverage scenario but increases staffing ratios to provide parity for underserved populations in access to primary care
6. **High PA, NP, CNM use**, which incorporates the baseline insurance setting forecasts but shifts the staffing patterns by doubling the use of PAs, NPs, and CNMs and assumes a non-physician trade off for physicians at a rate of 0.5 physicians per 1 non-physician provider.

Projections for the first five scenarios show, for 2005, increased needs over 1995 ranging from 10 to 23 percent for PCPs, 11 to 33 percent for PAs, 12 to 24 percent for NPs, and 0 to 12 percent for CNMs. Under the high NP/PA/CNM use scenario, which was considered unlikely by the workgroup, physician numbers were projected to be slightly less than 1995 levels, while need for the other practitioner groups more than doubled. The workgroup expected to see an evolution toward managed care and universal coverage during this time period. The workgroup saw as an objective for universal coverage the achievement of parity of health care services for minorities.

The resultant requirements projections are most directly related to the 9.4 percent population increase that occurred over this time period. Results are also closely related to the staffing models. Taking into account the staffing configurations for each insurance setting, primary care staffing ratios were not affected as much by managed care in contrast to other insurance settings as by distinctions between the insured and uninsured and between urban and rural populations. With the exception of NPs, staffing ratios were much less for uninsured populations. NPs and PAs were used more under managed care. PAs treated a disproportionate share of rural populations.

The scenario results suggest that the spread of managed care will not dramatically alter primary care requirements unless other forces precipitate changes in current staffing models. The model has been designed to allow users to incorporate their own assumptions and create new national scenarios through modifying the incorporated data on insurance setting distribution and staffing ratios.

The Results of Discussions on an Interdisciplinary Primary Care Workforce

The workgroup focused on two issues of particular importance to an interdisciplinary workforce: **collaboration** and **territorialism and power**.

The workgroup adopted the following definition of collaboration from M.C. Phaneuf (as quoted in *Issues in Collaborative Practice* edited by Jean E. Steel): “Collaboration is a true partnership wherein goal setting occurs, authority and responsibility for actions belong to individual partners, including a commitment to the belief that this collaborative relationship will enhance care outcomes.” Commitment, communication, mutual respect, flexibility, and acceptance of a fluid leadership structure based on the needs of situation are critical to collaboration.

Territorialism and the desire for power are key barriers to effective collaboration. These characteristics are displayed in a number of ways, from parallel education tracks and information systems and duplicative tasks to fears of direct economic competition.

Many workgroup members found that they equated a collaborative practice arrangement with a team, and they agreed that the current health care environment is leading to a team structure. They discussed various elements related to teams.

1. **Education in the Health Professions.** The concept of teamwork must be developed in the educational setting, when attitudes and identities are being formed. At the same time, educators should ensure that students have developed all of their areas of competence.
2. **Leadership.** Whereas a team works collaboratively, leadership of a team could best be described as collegial. Situational leadership may work on a team. However, it is important that a single individual take ultimate responsibility for the patient.
3. **Roles of Team Members.** Each profession has something unique to contribute to the team, with the result being synergistic. It is important to stress that one professional is not considered a “substitute” for another.
4. **Ethics.** Professional ethics need to be ensured. Particular points to be stressed are a focus on patient care along with team dynamics or service to the system; an

understanding of limits of competence; collegiality; the presence of checks and balances; responsibility; and commitment.

5. **Various Social Factors.** Other factors affect the operations of teams: gender, age, and education differences, the need for diversity, and the sometimes dysfunctional relationship between medicine and nursing.

The workgroup made recommendations based on three strategic considerations: (1) a new systems approach to the delivery of health care services with collaboration of health care personnel at all levels, i.e., clinicians, educators, professional associations, and insurers; (2) a shift in the focus of workforce development to reflect the health care needs of the population, with particular consideration to vulnerable groups; and (3) revitalization and reorientation of health care providers' education and practice to meet the challenges of a changing health care delivery system, while assuring the delivery of quality care.

Overall Findings and Recommendations

As the health care system moves rapidly toward a predominance of managed care service arrangements and, ultimately, universal health care coverage, it is critical to establish avenues for different types of health care providers to work together in meeting the nation's health care needs—taking into account needs compromised by location, income, culture, race, or ethnicity.

The Joint Workgroup on Primary Care Workforce Projections recommended that the Bureau of Health Professions and its Divisions of Medicine and Nursing continue their national efforts to plan and reshape the primary care workforce as a means of guiding the Nation's health care workforce in this transitional time. The workgroup noted the need for continuing collaboration between COGME and NACNEP to establish educational guidelines for schooling future care providers who would learn to contribute effectively within a team-oriented approach to health care and deliver health care services to the broadest population possible.

The workgroup recommended that:

1. The Federal Government continue to recognize the national significance of interdisciplinary workforce planning and development.
2. The Federal Government initiate health workforce supply-related adjustments in response to the likely integrated primary care workforce scenarios.
3. The Bureau of Health Professions continue to serve as the national focal point for health workforce analytic, planning, and development activities in general and strengthen their capabilities regarding the primary care workforce.

4. The respective national advisory councils, COGME and NACNEP, continue both individual and joint workforce development activities.

Conclusion

The historic convening of the Joint Workgroup on Primary Care Workforce Projections resulted in important first steps. For analytical purposes, a model now exists to estimate integrated requirements for primary care practitioners. The assumptions and methodology of this model were carefully scrutinized to ensure that its results will be as valid as possible after accounting for the limitations. In addition, the workgroup not only discussed important elements of collaboration, but mirrored such cooperation in their own meetings. Finally, the recommendations of the workgroup and its findings pave the way for the important work that must take place to assure an adequate primary care workforce to meet the health care needs of the public.

I. The Background of the Joint Workgroup

Introduction

The effort of the Joint Workgroup on Primary Care Workforce Projections was the first of its type undertaken by the Federal Government. Although national health workforce planning has been under way in the Federal Government for several decades, the collaborative, joint effort of the two key national professional advisory committees, the Council on Graduate Medical Education (COGME) and the National Advisory Council on Nurse Education and Practice (NACNEP), is unprecedented. Both the process of joint effort on the part of these councils and the important findings and recommendations in this report represent a landmark development in Federal assurance of a cost-effective primary care workforce. Given the increasing importance of effective primary care and collaborative professional practice to the rapidly changing health care system of this country, the efforts of this workgroup are particularly instructive and timely.

Background

The Bureau of Health Professions (BHP_r) of the Health Resources and Services Administration (HRSA) in the Department of Health and Human Services (DHHS) has long been the key Federal focus for national health workforce development. In addition to administering contracts and grants to ensure an adequate supply, distribution, and mix of health professionals to meet the health care needs of the public, the Bureau has been the focal point for national health workforce analytic and planning activities. As part of its role in this regard, the Bureau and its Divisions of Medicine and Nursing have provided the institutional leadership and support for both COGME and NACNEP. The councils themselves are chartered advisory councils to Congress and the Secretary of the DHHS and have been a crucial ongoing mechanism for input and advice from both the professions and public.

In 1992, the BHP_r recognized that while COGME and NACNEP were engaged in significant activities relating to medicine and nursing, respectively, there was an increasing need to develop interdisciplinary approaches to health workforce planning that could build on and complement the discipline-specific activities. The Bureau was particularly interested in focusing these initial efforts on primary care providers, including primary care physicians (PCPs), nurse practitioners (NPs), certified nurse midwives (CNMs), and physician assistants (PAs). Dr. Fitzhugh Mullan, Director of BHP_r, commissioned an internal workgroup, headed by Dr. Marla Salmon, Director of the Division of Nursing, to propose strategies for developing interdisciplinary workforce planning. The recommendations of that group were based on some key assumptions that have continued to guide the Bureau's work in this area: (1) any efforts to integrate workforce planning across the four disciplines of interest should involve experts from those disciplines in the actual process; (2) such a process should be continuous and based on demand and need for services, patterns of and settings for primary

care delivery, competence and scope of professional practice, health systems trends, occupation-specific health workforce data and projections and expert opinion; and (3) the analytic and planning work then under way by BHP_r, COGME, and NACNEP would be essential to the success of any integrated workforce planning strategy.

The Bureau's internal workgroup suggested implementation of a long-term strategy in which the two councils' individual workforce planning activities (physician and PA for COGME; NP and CNM for NACNEP) serve as cornerstones for a joint effort in the area of integrated primary care workforce planning. This recommendation, along with subsequent recommendations by NACNEP (in 1993) and COGME (in 1994), was the basis for the creation of the Joint Workgroup on Primary Care Workforce Projections, supported by both BHP_r and HRSA and the Bureau's own contract on modeling primary care workforce requirements, for which the joint workgroup provided advice and guidance.

Roles and Histories of COGME and NACNEP

COGME was authorized by Congress in 1986 to provide an ongoing assessment of physician workforce trends and to recommend appropriate Federal and private-sector efforts to address identified needs. The legislation calls for COGME to serve in an advisory capacity to the Secretary of the DHHS, the Senate Committee on Labor and Human Resources, and the House of Representatives Committee on Commerce.

The legislation specifies that the council will have 17 members. Appointed individuals are to include representatives of practicing primary care physicians, national and specialty physician organizations, international medical graduates, medical student and house staff associations, schools of medicine and osteopathy, public and private teaching hospitals, health insurers, business, and labor. Federal representation includes the Assistant Secretary for Health, DHHS; the Administrator of the Health Care Financing Administration (HCFA), DHHS; and the Chief Medical Director of the Veterans Administration (VA). COGME is staffed by the Division of Medicine, BHP_r, HRSA.

Although called the Council on Graduate Medical Education, the charge to COGME is much broader. Title VII of the Public Health Service Act, Section 799(H), as amended by Title III of the Health Professions Extension Amendments of 1992, requires that COGME advise and make recommendations to the Secretary and Congress on the following:

1. The supply and distribution of physicians in the United States
2. Current and future shortages or excesses of physicians in medical and surgical specialties and subspecialties
3. Issues relating to foreign medical school graduates

4. Appropriate Federal policies with respect to the matters specified in (1), (2), and (3) above, including policies concerning changes in the financing of undergraduate and graduate medical education programs and changes in the types of medical education training in graduate medical education programs
5. Appropriate efforts to be carried out by hospitals, schools of medicine, schools of osteopathy, and accrediting bodies with respect to the matters specified in (1), (2), and (3) above, including efforts for changes in undergraduate and graduate medical education programs
6. Deficiencies and needs for improvements in existing databases concerning the supply and distribution of, and postgraduate training programs for, physicians in the United States and steps that should be taken to eliminate those deficiencies.

NACNEP was originally authorized by Congress on September 4, 1964, under Section 851 of the Public Health Service Act, as amended (42 USC 298), as the Advisory Council on Nurse Training. This council advises the Secretary of the DHHS and the Division of Nursing on matters concerning nursing education and practice, the nursing workforce, and the implementation of Title VIII legislation. The council was renamed in 1992 to emphasize the focus on practice.

NACNEP is composed of the Secretary or designee as chair, an ex-officio member, and twenty-one members selected by the Secretary. The appointed members are to include three full-time students representing the various levels of education in schools of nursing; four representatives of the general public; twelve leading authorities from various fields of nursing, higher and secondary education, and representatives of hospitals and other institutions and organizations that provide nursing services; one practicing nurse; and one representative of associate degree schools of nursing. Federal representation includes the Director of the Division of Nursing, BHPPr, who the Secretary has designated as the Chair. NACNEP is staffed by the Division of Nursing, BHPPr, HRSA.

The council is governed by the provisions of Public Law 92-463, which sets forth standards for the formation and use of advisory committees. The council advises the Secretary on all matters related to nursing and makes recommendations on the following:

1. The enhancement of the composition of the nursing workforce
2. The improvement of the distribution and use of nurses to meet the health needs of the nation
3. The enhancement of the quality of nursing practice, through the expansion of the knowledge, skills, and capabilities of nurses

4. The development and dissemination of improved models of organization, financing, and delivery of nursing services
5. The promotion of interdisciplinary approaches to the delivery of health services, particularly in the context of public health and primary care.

History of BHPPr-Related Health Professions Planning

BHPPr has been involved in workforce planning since its inception. Both COGME and NACNEP recently prepared reports of workforce projections. In its sixth report, *Managed Health Care: Implications for the Physician Workforce and Medical Education* (1995), COGME addressed requirements for physicians. In its report *Physician Assistants in the Health Workforce 1994* (1994), COGME addressed requirements for PAs. NACNEP, through its *Report to the Secretary of Health and Human Services on Workforce Projections for Nurse Practitioners and Nurse Midwives* (1994), addressed requirements for NPs and CNMs. One of the conclusions of NACNEP's report was the need for determining overall workforce requirements for primary health care providers.

Such interdisciplinary planning was already being considered within HRSA. In 1992, the Bureau Quality Council established an internal ad hoc workgroup, chaired by Dr. Marla Salmon, to examine how such planning should take place. The workgroup recommended that COGME and NACNEP take the lead in the effort. This recommendation was endorsed by the Bureau's Quality Council. In spring 1994, both councils agreed to participate in a joint effort to examine the requirements for primary care practitioners, integrating the contributions of NPs, CNMs, PAs, and physicians in providing for all the primary care service needs of the U.S. population.

The development of the Workgroup on Primary Care Workforce Projections is particularly timely, as the Clinton Administration has presented specific proposals for refocusing Federal support for the education of primary care practitioners and has consistently worked to eliminate barriers to the full use of competencies of various types of practitioners. The shift towards primary care and different approaches to primary care is already under way in our society. What has not yet been achieved is the development of integrated approaches to planning a primary care workforce that is responsive to the needs of the changing system of services. This joint effort was meant to be the beginning of such an approach.

II. Introduction to the Workgroup

The workgroup was initiated with a clear plan, a defined process, and carefully chosen members. These are described below.

Goals

Two equally important goals were established for the workgroup:

1. To provide advice and input to a contract designed to develop an analytic model to estimate integrated requirements of NPs, CNMs, PAs, and physicians for delivery of primary health care services. In particular, the workgroup was to assist in developing assumptions and parameters and to review interim products of the contract.
2. Explore broader issues relating to the development of a collaborative, interdisciplinary primary care workforce. These deliberations were considered essential to creating a constructive and relevant national primary care workforce agenda.

In addition to these goals, the Workgroup on Primary Care Workforce Projections has been viewed by both councils and BHPPr as a forum for developing and modeling constructive interprofessional relationships.

Chronology and Process of Meetings

Both the contract for the integrated requirements model and the workgroup were planned to be completed within a year's time. The first workgroup meeting was used as an orientation to the goals to be accomplished; the remaining three workgroup meetings were scheduled to coincide with key decision points for the contractor, as written into the contract's scope of work. The workgroup was to present their findings and recommendations to the full membership of COGME and NACNEP in September, 1995.

For each meeting, broad objectives, specific objectives, and expected outcomes were outlined and distributed to members. In addition, workgroup members were given a list of their responsibilities, which included review of background material prior to each meeting. (See Appendix D for an annotated bibliography of materials that were distributed.)

The first workgroup meeting was held October 25, 1994. During that meeting, the group became oriented to one another and the overall role of the workgroup itself. In addition, the group identified key issues that it wished to explore apart from the work of the contract. They also developed ground rules to facilitate the overall process and decision making of the workgroup.

During the second meeting, held December 6-7, 1994, the contractor presented an overview of the objectives of the model and underlying data and research developed to that date.

Workgroup members engaged in a discussion of the directions in which the health care system is moving, elements which may impact determinations on the future use of primary care providers. In response, workgroup members examined results from the contractor's preliminary literature review and provided validity checks; placed boundaries on existing data; assessed the approach; assessed strategies that might be helpful to the development of the contract framework; and initiated discussions of assumptions. The workgroup also moved forward with defining specific activities for the two subgroups and the overall workgroup relating to two priority issues: **power and territorialism** and **educational and organizational factors associated with successful interdisciplinary collaboration**. Both subgroups requested that papers be commissioned reflecting the state of the art in each area for consideration at the next meeting.

The third meeting was held April 25-26, 1995. The workgroup reviewed and commented on the proposed model being developed by the contractor; they offered feedback on the assumptions that were used in the development and suggested additional assumptions they thought were appropriate. The workgroup also reviewed and discussed the issue papers prepared for the meeting (see Appendix A) and determined that the two subgroups would write a paper for the August meeting that would synthesize and meld their recommendations.

On August 16-17, 1995, the fourth meeting was held. Members reviewed the results of the contractor's work on the integrated requirements model, reviewed the report prepared by the subgroups and made recommendations regarding its disposition, developed recommendations based on the group's work, and finalized plans for presenting the final workgroup report to the full membership of COGME and NACNEP.

Workgroup Members, Staff Members, Contract Support

The workgroup was composed of members of COGME, members of NACNEP, and ex officio members representing PAs, NPs, and CNMs, as follows:

Co-Chairs:

David A. Kindig, MD, PhD, Professor of Preventive Medicine, University of Wisconsin at Madison Medical School (chair of COGME)

Marla E. Salmon, ScD, RN, FAAN, Director, Division of Nursing, Bureau of Health Professions, HRSA (chair of NACNEP)

From COGME:

Paul C. Brucker, MD, President, Thomas Jefferson University, Philadelphia, Pennsylvania

Huey Mays, MD, MBA, MPH, Executive Director, Integrated Health Management, Johnson & Johnson, Piscataway, New Jersey

Stuart J. Marylander, MPH, Vice President, Hospital Services Division, Country Villa Health Services Corporation, Marina del Rey, California

From NACNEP:

Rhetaugh G. Dumas, PhD, RN, Vice Provost for Health Affairs, University of Michigan, Ann Arbor

Dolores Sands, PhD, RN, FAAN, Dean, School of Nursing, The University of Texas at Austin
Cynthia Freund, PhD, RN, Dean, School of Nursing, University of North Carolina at Chapel Hill (resigned following the December 1994 workgroup meeting)

Ex Officio:

James F. Cawley, MPH, PA-C, Associate Professor of Health Sciences, Physician Associate Program, The George Washington University, Washington, D.C.

Elizabeth Coyte, PA-C, Redfield Medical Clinic, Redfield, Iowa

Diane Hanna, RNC, MS, FNP, Nurse Practitioner, Medical College of Virginia—Virginia Commonwealth University, Richmond, VA

Ruth Watson Lubic, EdD, CNM, RN, Maternity Center Association, New York, New York

Ex officio members had voting rights equal to those of members from the two councils.

HRSA staff from the BHP_r supported the workgroup. Ms. Evelyn Moses of the Division of Nursing and Mr. Edward Sekscenski of the Office of Research and Planning were co-project officers for the integrated requirements model contract and coordinated workgroup interaction with the contractor. Ms. Margaret Truax of the Division of Nursing and Dr. Carol Gleich of the Division of Medicine coordinated logistics for the meetings with the support contractor, TASCAN, Inc.



III. The Status of the Primary Care Workforce: Review of the Literature

The workgroup reviewed the status of the primary care workforce through many mechanisms including presentations by experts in the field during workgroup meetings, examination and discussion of the contractor's literature review (see Appendix B), and their own informal discussions of workforce issues.

The following presentations were made during the meetings:

- Dr. Mary Munding, Dean of the Columbia University School of Nursing, presented some statistics and scenarios affecting workforce projections, particularly regarding nursing.
- Dr. Michael Whitcomb, Director of the Graduate Medical Education Division of the American Medical Association, discussed challenges involved in workforce planning.
- Dr. Richard Scheffler, Economist at the University of California at Berkeley, reviewed the literature on the clinical effectiveness, cost-effectiveness, productivity, and barriers to practice for NPs and PAs.
- Dr. Neal Vanselow, Scholar in Residence at the Institute of Medicine and Chancellor of the Tulane Medical Center, reviewed the activities of the Institute of Medicine Committee on the Future of Primary Care.

Workgroup members also received current reports and studies as background materials for each meeting (see Appendix D for annotated bibliography).

The status of the primary care workforce is an important context for understanding the report and the workgroup's recommendations. Before discussing the workforce per se, this section reviews the scope of primary care and the demand for such services, then moves to the utilization and competencies of providers, their productivity, and their cost effectiveness. The contract with Vector Research, Inc. to develop the Integrated Requirements Model (IRM) contained a requirement to conduct a literature search including these elements. In great part, this section summarizes the material contained in the report of that search. The full discussion can be found in Appendix B as an attachment to the report on the model.

Definition and Categorization of Primary Care

Very little consensus exists on the definition of primary care. It can be based on the type of provider seen, the orientation to providing care, or the specific types of services and care

provided. The workgroup endorsed the definition developed by the Institute of Medicine in 1994:

Primary care is the provision of integrated, accessible health care services by clinicians who are accountable for addressing the large majority of personal health care needs, developing a sustained partnership with patients, and practicing in the context of family and community.¹

Applying this definition can be complicated when work currently done by specialists falls within the scope of primary care and vice versa. Adding to the complexity are the different systems that exist for categorizing primary care services. With the exception of maternity services, which are low-risk or high-risk, diseases can be categorized by detailed international classification of disease (ICD) codes, the internal classification of primary care (ICPC) codes, and physicians' current procedural terminology (CPT) codes. Another scheme was devised by Schneeweiss and Hart, who established 27 diagnostic clusters derived from National Ambulatory Medical Care Surveys.

The Demand for Primary Care

Demand for primary care services results from a combination of the following elements: the underlying health status of the population as reflected in the incidence of disease and injury; the affordability of primary care; the availability of primary care and the health care delivery system; and the perceived need for and barriers to primary care. Demand differs based on the demographic, socioeconomic, and cultural characteristics of the population, as noted below.

- **Demographic characteristics.** Urban residents demand more services than rural residents. In terms of age, demand is lower for population groups from birth to middle age (except for women of childbearing age) and higher for older groups.
- **Socioeconomic characteristics.** People with higher levels of income demand more health services. In addition to affecting the purchasing of insurance, economic resources affect lifestyle and mobility (access to care).
- **Cultural characteristics.** Even after adjusting for differences in income, data have shown that white individuals are more likely to visit a physician during a given time period than black individuals. Culture affects individuals' perceptions of the need for health care and the role of health care providers. Additionally, barriers to care may exist for different ethnic or cultural groups.

¹ Institute of Medicine Committee on the Future of Primary Care. *Defining Health Care: An Interim Report*. Washington, D.C.: IOM, 1994.

Workgroup members struggled with the question of demand. They wanted to differentiate between the demand of the general population and the demand of high-risk populations, and to identify the demand of those groups who cannot leave their primary place of residence to receive care, such as the homebound or the incarcerated. They also noted that demand begins in the home as someone in the home decides when it is necessary to seek health care services. Demand should also consider the impact of practitioner supply on demand and the public health/primary care interface, since many in public health actually provide primary care.

Demand and need cannot be equated. Demand can be initiated by the patient, the patient's parent or caregiver, or even the provider, and can be constrained by availability of services and the financial means to support them. Need can be epidemiologically determined and dependent on health status and determination of appropriate health care. Most data systems used in generating workforce requirements are demand based. One approach to estimating need is using guidelines and other standards developed as appropriate delivery of health care activities or health care outcomes. The DHHS *Healthy People 2000* guidelines, a framework for Federal intervention, as well as a report from the U.S. Preventive Services Task Force, could serve as starting points for such an approach.

Utilization and Competencies of Different Providers

The workgroup recognized a variety of primary care providers: physicians, NPs, PAs, and CNMs. While there are commonalities among them, each group is unique. Physicians have a depth of medical knowledge that exceeds that of other groups, and are particularly well qualified to care for patients with complex illnesses, especially those involving multiple systems. NPs tend to excel in health education, preventive health, counseling, follow-up care, and care for patients with chronic illness. They have a unique elasticity that allows them to act in different roles, from discharge planner to case manager to triage, among others; a large proportion of NPs are involved in primary care. PAs assist physicians in treating both acute and chronic illnesses. While PAs tend to be distributed as physicians are for primary versus specialty care, they are more likely to practice in rural areas. CNMs bring a particular perspective to assisting at low-risk births. They can also provide services to healthy women and their babies in the areas of well-woman gynecology, normal newborn care, family planning, prescriptions, preconception care, and counseling in health promotion and disease prevention, although limited data exist in these areas. Competencies, however, vary not only among the different types of practitioners but also within each of these groups.

Another way of assessing the competencies of different types of providers is to determine the proportion of primary care services that can be performed by each. The literature indicates that NPs and PAs can perform as much as 80 percent of primary care tasks, but caution is needed in deriving substitution rates from such task-based data. Although only 5 percent of all U.S. births are currently attended by CNMs, the number could be much higher: Kaiser Foundation indicated that 70 percent of low-risk births at one of its HMOs were managed by

CNMs. The literature overwhelmingly indicates that the quality of care provided by NPs, PAs, and CNMs, within their areas of expertise, is at least as good as that provided by physicians.

Productivity

The literature refers to three ways productivity is measured—time per visit, number of visits per unit of time (such as day or week), and practice productivity. Productivity is also measured on a population base, i.e., the number of practitioners required per 100,000 population.

In general, factors affecting productivity of primary care practitioners include group size (groups were found to be more productive than individuals, with small groups more productive than larger groups), income incentives (fee-for-service more productive than salaried), and physician delegatory style (the more delegation, within the realm of the NP's competencies, the more efficient the NP).

Workgroup members expressed many reservations about the usefulness of productivity data. They stressed that visits are an unstable unit of measurement. First, visits may have entirely different contents or levels of intensity, making comparisons meaningless. Second, all visits cannot be assumed to be necessary. Other methods of analysis have limitations as well. No method of analysis is without limitations given the present state of knowledge. The choice of method is partially dependent on the purpose of the analysis being undertaken. In attempting to derive data on substitution and complementarity in managed care settings, heavy reliance was placed on data showing the relative sizes of patient panels able to be cared for by different professional mixes.

Other factors that also complicate measures of productivity include (a) the possibility of physicians generating their own demand; (b) the exclusion of the role of generalist nursing and other services from the analyses; and (c) the exclusion of links with public health nursing and case management services.

Two broader concepts were related to productivity. The first, called "offloading," involves work being given to the lowest level of provider that can competently provide the service. For example, if a primary care physician can do the work, then a specialist should not; if an NP or PA can perform the task, then a primary care physician should not. The goal of offloading is cost effectiveness. The workgroup did not endorse the concept, but recognized its existence. The second concept was "substitution." Workgroup members emphasized that the term typically refers to NPs, PAs, or CNMs taking on the work of physicians and, thus, should not be used as it neglects the *unique* contributions of each of these practitioners.

Cost Effectiveness

Although the evidence supports the cost effectiveness of non-physician providers, there is uncertainty about end results because the issue is complex and most of the data are outdated. Supporting the cost-effectiveness argument are the facts that salaries are lower; NPs and PAs tend to use less technological means (such as tests) in their treatment, thus saving money; and their education is less expensive. Other factors to be considered in the equation, however, are productivity and the fact that if charges for the service are the same for physician and non-physician, society may not see the lower costs.

Members felt strongly that the issue of cost effectiveness was both timely and important and must be addressed in the model. Cost would affect both the demand side and the supply side, particularly under health care reform. Cost involves more than just salary. The broadest picture of health care efficiency involves the lost productivity of the American population and costs of care for chronic disorders that are not diagnosed early. Finally, questions of cost-effectiveness involve necessarily explicit comparisons.

To better understand workforce issues, additional research is needed in the areas of cost effectiveness and productivity.

IV. Key Issues Relating to the Overall Primary Care Workforce

One of the primary goals of the workgroup was to discuss and act on important issues in the area of the primary care workforce. The process developed to achieve this goal was to divide into two subgroups. At the first meeting, the workgroup identified issues of interest, ranging from the definition of competency for providers to educational funding. For the remaining meetings, the subgroups focused on *collaboration* and *territorialism and power*. To add insight and perspective to their discussion, the subgroups commissioned papers on each of these themes: Clair Fagin wrote "Thoughts on Collaboration Between Physicians and Nurses" and DeWitt C. Baldwin, Jr., wrote "Territoriality and Power in the Health Professions" (both included as Appendix A). The workgroup found these papers very helpful.

As the full workgroup then discussed both issues, members found that they were focusing on a continuum of interrelated ideas. The views are summarized here, starting with collaboration in general and the barriers presented by territorialism and power, and moving to the more specific definition of teams, with its educational and practical implications.

Definition of Collaboration

The workgroup adopted the following definition of collaboration from M.C. Phaneuf (as quoted in *Issues in Collaborative Practice*, edited by Jean E. Steel):

Collaboration is a true partnership wherein goal setting occurs, authority and responsibility for actions belong to individual partners, including a commitment to the belief that this collaborative relationship will enhance care outcomes.

Several goals and values were considered inherent to this definition, including improved care and satisfaction for the patient and enhanced opportunities, incentives, and a more rewarding work environment for the care providers. For collaboration to occur, commitment, communication, mutual respect, flexibility, and acceptance of a fluid leadership structure were critical.

Territorialism and Power: Barriers to Effective Collaboration

Territorialism and the desire for power were key barriers to effective collaboration. These characteristics were displayed in a number of ways, from parallel education tracks for medicine and nursing, parallel documentation systems maintained by physicians and other practitioners, and duplicative tasks and functions in the provision of care. These characteristics also include fears of direct economic competition from different categories of practitioners.

Some partnerships can appear to be collaborative when traces of territorialism are still present. In a true partnership, the providers are more concerned with working together for the good of the patient than in ensuring that their own needs are met. Many workgroup members found that they equated a collaborative practice arrangement with a team.

Teams: An Overview

The group used the following definition of teams:

Teamwork is a special form of interactional interdependence between health care providers, who merge different, but complementary, skills or viewpoints in the service of the patient and in the solution of his or her health problem(s).

Workgroup members agreed that the current health care environment is leading into a team structure. Mr. Baldwin listed the various factors involved in the paper.

1. **Changes in the concept of health care**, from a focus solely on disease and death to one on health and well being
2. **Changes in the models of medical practice**, from solo to group practice arrangements
3. **Changes in the locus of health service delivery**, from hospitals and outpatient departments to neighborhood-based, ambulatory, health care centers
4. **Changes in the status of the patient**, from passive recipients to active participants in the health care process
5. **Changes in relationships among the health professions**, from traditional, authoritarian, status-oriented, hierarchical relationships to more democratic, participatory, peer level relationships
6. **Changes in the financing of services**, from strict fee-for-service charges by physicians to reimbursement for non-physician providers.²

Various elements enter into the discussion of teams: the definition of work to be done, the organization of the work, the division of work, the leadership, and the legal sanction. Some of the influencing factors mentioned were the reality of patient care, the political reality of the

² DeWitt Baldwin, "The Role of Interdisciplinary Education and Teamwork in Primary Care and Health Care Reform."

organization, and the economic reality of corporate interests, plus forces related to gender, empowerment, and rights. Workgroup analysis of these factors is presented below.

Education and Team Building

Educational models are one barrier to interdisciplinary teamwork. Many workgroup members were convinced that the concept of teamwork must be developed in the educational setting, when attitudes are being formed and students are developing their professional identities. Students in specific professional tracks know clearly what distinguishes them from students in other professional tracks, but they are less likely to see the commonalities. Because of this, it's important for them to have the opportunity to work with others. At the same time, educators should ensure that students have developed all of their areas of competence, rather than relying on someone else on the team to make up for their deficiencies. Interdisciplinary education will have the additional benefit of providing students with role models who collaborate with other health professionals.

Some workgroup members preferred to focus on practice rather than education as the priority for teams. However, even they agreed that health care providers may eventually look for individuals with collaborative training, much as corporate executives now look for MBAs trained in the dynamics of team management.

The group suggested that interdisciplinary education programs should be based on patient need and evaluated by patient outcome. At the same time, they acknowledged the general barriers to interdisciplinary education, such as the separate funding streams. Perhaps graduate medical education could be changed to include graduate health education and embrace different types of providers. Another obstacle is the expense involved in training in an ambulatory setting.

Teams in Practice: Governance

The leadership of a team generated a lively dialogue among workgroup members. Some believed that an ad hoc or fluid leadership would be best, wherein the expert for a particular situation assumed leadership. This is a natural phenomenon in group interaction. However, others felt that such fluid leadership presented problems with regard to responsibility and accountability. Could the team or only a specific individual be held accountable for patient care? In the end, all agreed that even in a fluid leadership situation, one person must be the main contact with the patient and be accountable for that person's care.

Who is the best person to lead? Some saw physicians as the natural leaders because of the length of their education and their scientific-based training, as well as public expectations and state recognition. Others suggested that along the spectrum of work, physicians might lead or take responsibility for more acute care, whereas other providers may be more responsible for population health. It was agreed that the practitioner who assumed leadership—whether

primary care physician, NP, PA, or CNM—should know the limits of his or her competence and the point at which a referral was required. Additionally, as NPs, PAs, and CNMs begin to assume leadership more frequently, the legal scope of practice must be considered.

Workgroup members differentiated between leadership at the patient level versus the organizational level. Collaboration between disciplines appeared to be easier at the patient level.

Another distinction made by the workgroup was collegial versus hierarchical leadership. Collegial leadership was based on the individual's skills—his or her education, experience, and so forth—and others' recognition of these qualities and acceptance of his or her leadership. Collegial relationships require more effort; people tend to default to hierarchical relationships because they are accustomed to them. For a collegial manager, 95 percent of his or her time is spent inspiring and influencing rather than issuing directives. Hierarchical leaders, instead, tend to manage from positions of power. Again, collegial leadership was viewed as being easier to practice at the client level rather than in professional organizations.

Although the workgroup recognized that the environment and leadership models are changing, it was pointed out that any deficiencies of the past may be related more to the particular style and practice of the leaders than to the system itself. These leaders may exhibit inappropriate leadership behavior, lack of knowledge, lack of leadership skills, and perhaps even lack of interest in leadership skills.

Teams in Practice: Composition and Roles of Team Members

Although the workgroup did not discuss the exact composition of a team for different health scenarios, they stressed that each professional had something unique to contribute, with the result being synergistic.

From the first meeting, workgroup members also expressed dissatisfaction with the term "substitutability"—whether speaking of tasks within teams or actual role substitution. The term, which may engender thoughts of competition rather than collaboration, is a catalyst for conflict. However, the group acknowledged that task overlap does exist, as well as duplicative efforts, and these need to be addressed along with the unique contributions of each health professional.

Ethics

With the formation of teams and the new managed care environment, workgroup members noted that it was important to stress professional ethics.

- **A focus on patient care.** The goal of a team is not to get along or to benefit the organization, but to best serve the patient. Often, if one is oriented to serving the

system, the patient suffers, and vice versa. Current rewards, however, are linked with serving the system.

- **Determining quality.** If the team of health professionals does not ensure and determine quality, someone, perhaps less qualified, will usurp the function.
- **Understanding limits.** Team members must know the limits of their competence.
- **Collegiality.** Team members must foster a collegial relationship and be able to negotiate and work through any tensions. At the same time, there should be checks and balances on the team. A dynamic tension between different groups of professionals can benefit the patient.
- **Responsibility.** All must be accountable for their decisions.
- **Commitment.** Patients must be able to rely on their providers, and the team members must be able to rely on each other. Patient care requires commitment.

Experience with Teams

The workgroup acknowledged the many efforts toward interdisciplinary education and teamwork that have been initiated over the past few decades, including the National Joint Practice Commission, which brought together the American Medical Association and the American Nursing Association in the early 1970s and disbanded in the early 1980s, and the research projects presented in the annual Proceedings of the Interdisciplinary Care Team Conferences, which were begun in 1978. As Dr. Fagin stated in her paper, large-scale collaboration has been attempted but has not always been successful. It will be important, then, to learn from the past. Dr. Baldwin's paper, "The Role of Interdisciplinary Education and Teamwork in Primary Care and Health Care Reform," discusses the phases of these efforts and also lists some barriers to success.

Social Issues Affecting Collaboration

Collaboration involves many complex social factors, including the following:

1. Gender differences
2. Differences in perceptions of authority between younger and older physicians
3. Changes in the division of labor of health care delivery

4. The need for diversity. There is a need for a growing diversity of human resources in a range of systems, including the health care system. The barriers to such diversity should be identified.
5. The sometimes dysfunctional relationship between medicine and nursing, which has its roots in historical interactions
6. The need to involve and empower patients and their families
7. The need to involve the full spectrum of providers, not just nursing and medicine
8. The need to understand the different evolutions of NPs, PAs, and CNMs, as different tensions are present

Additionally, the workgroup identified several gaps in the research, such as the relationships and interactions of PAs and NPs and the most appropriate mixes of providers.

Recommendations on *Collaboration and Territorialism and Power*

The workgroup made recommendations related to the issues of collaboration and territorialism and power. These recommendations are presented in full in Appendix C. They have three strategic aims:

- A new systems approach to the delivery of health care services and collaboration of health care personnel at all levels, i.e., clinicians, educators, professional associations, and insurers
- A shift in the focus of workforce development to reflect the health care needs of the population, with particular consideration of vulnerable groups
- Revitalization and reorientation of health care providers' education and practice to meet the challenges of a changing health care delivery system, while ensuring the delivery of quality care.

Some of the themes of these recommendations have also been incorporated into the workgroup's overall recommendations, presented in Section VI of this report.

V. Modeling Integrated Requirements for the Primary Care Workforce

The workgroup collaborated with Vector Research, Inc., the contractor carrying out the study to develop a model to project integrated requirements for physicians, PAs, NPs, and CNMs for the delivery of primary care services, and its subcontractors, Lewin-VHI and Research Triangle Institute. Members of the workgroup provided advice on the literature review, the modelling approach and the assumptions underlying the model and the scenarios, and the contractor's final report. In their fourth meeting, workgroup members unanimously voted to endorse that report and the methodology the contractor developed for projecting the integrated workforce requirements.

This section contains a brief summary of the modelling approach and the projected requirements under six scenarios for the delivery of primary care coverage. A more comprehensive discussion can be found in Appendix B.

Literature Search

The first step in the development of the integrated requirements model (IRM) was to review the relevant research and data. Searches were conducted for information in the following three areas: (1) primary care services delivery options; (2) primary care services demand; and (3) government and private sector health care reform. Information from this literature search was summarized in Section III and is included in full in Appendix B.

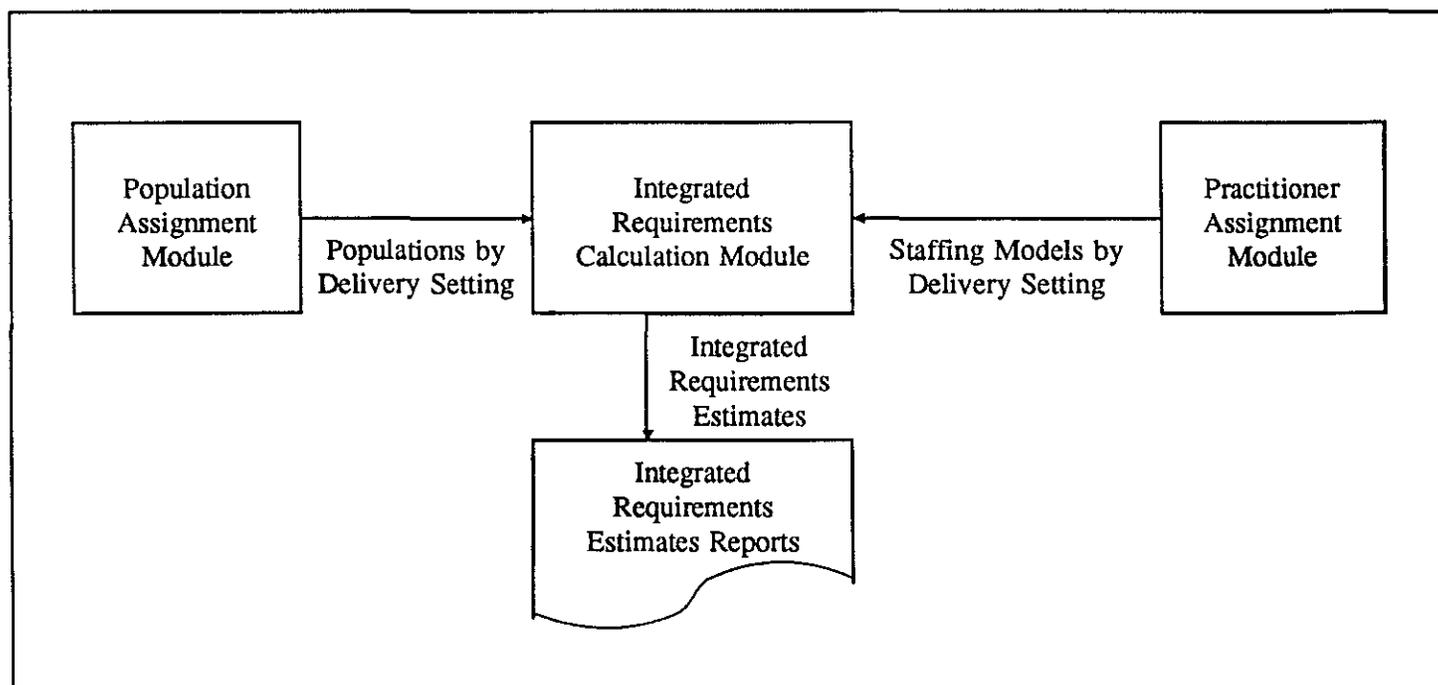
The Workgroup's Input into the Model

In addition to applying results of the literature search to the model, the contractor also relied on the input of the workgroup. The workgroup discussed all of the issues and assumptions, from market trends to productivity to cost effectiveness to numbers of providers; assisted in locating appropriate sources of data; suggested that the model have some means of showing cost-effectiveness; provided input on the appropriate scenarios to include in the model; suggested that the model allow for provider substitution and ensure that substitution parameters could be defined and modified by the user; emphasized that staffing models should be based on observed patterns of staffing rather than on theories outlining the most cost-effective mixes; discouraged the use of visits as a measure of productivity; suggested that the model have the capability of incorporating unmet needs rather than simply reflecting current demand for services; suggested ways to make the model more user-friendly and modifiable by users; and suggested ways to simplify the model so that its assumptions and limitations would be understood.

IRM Model Structure and Methodology

Conceptually, the IRM uses a capitated approach, forecasting requirements for primary care practitioners per 100,000 people. Primary care practitioners are defined as family practice, general internal medicine, general pediatrics, and obstetrics/gynecology physicians; primary care PAs; NPs; and CNMs. The model is divided into three distinct modules: a population assignment module, a practitioner assignment module, and an integrated requirements calculation module. Exhibit 1 illustrates this concept.

Exhibit 1: Model Overview



The essence of the capitated methodology is to assign populations to specific health care delivery settings and then to choose a staffing configuration for each setting. Health care delivery settings are defined according to age, location, and insurance status. The population assignment module distributes the U.S. population across the detailed delivery settings listed in exhibit 2.

The practitioner assignment module assigns practitioner staffing models to the aggregated health care delivery settings listed in exhibit 3.

Exhibit 2: Insurance Distribution Data Characteristics

Description	Categories	Category Count
Sex	Male, Female	2
Age	0-4, 5-17, 18-44, 45-64, 65-74, 75-84, 85+	7
Location	Urban, Rural	2
Insurance Type	Staff HMO, IPA HMO, Fee-for-Service (FFS), Medicaid Staff HMO, Medicaid IPA HMO, Medicaid FFS, Medicare Staff HMO, Medicare IPA HMO, Medicare FFS, No Insurance	10

Exhibit 3: Aggregated Health Care Delivery Systems

Urban	Rural
Staff HMO	Staff HMO
IPA HMO	IPA HMO
Fee-for-Service	Fee-for-Service
No Insurance	No Insurance

Both of these modules feed their resultant data into the integrated requirements calculation module, which also assigns compensation levels to each practitioner type and then makes the necessary calculations to produce the forecasts of integrated practitioner requirements. The model also produces reports summarizing the population by insurance setting, and a report on the practitioner staffing models associated with the scenario being run.

IRM Scenario Definitions

The IRM produces annual forecasts for the years 1995 through 2020. All scenarios incorporate U.S. Bureau of Census projections of the U.S. population by age and sex. The distribution of the population by setting (urban/rural and insurance status) and the staffing patterns associated with each aggregated setting were estimated by the project team for 1995 and modified in future years to varying degrees in each of the IRM scenarios.

The six scenarios that are provided with the model are defined below.

1. **Status quo:** The 1995 insurance distributions and staffing models are applied in all projection years to measure the effects of changing U.S. population demographics only; all else held constant.
2. **Baseline insurance projections:** In addition to shifts in population demographics, estimated shifts in insurance coverage are incorporated, making this scenario the contractor's "best estimate" baseline forecast.
3. **High managed care:** Populations are shifted into HMO settings to a greater degree than in the baseline insurance projection scenario. This scenario is modeled for the year 2005.
4. **Universal coverage:** Building on the high managed care scenario, the uninsured population is then shifted into other insurance settings, particularly HMOs. This scenario also assumes increases in preventive care in fee-for-service, thus increasing fee-for-service staffing levels. This scenario is modeled for the year 2005.
5. **Equal access under universal care:** Building on the universal coverage scenario, staffing models are increased as required to provide parity for underserved populations in access to primary care. This scenario is modeled for the year 2005.
6. **High PA, NP, and CNM:** Insurance settings are forecast the same as for the baseline insurance projection scenario. Staffing patterns are shifted by doubling the use of PAs, NPs, and CNMs, assuming a "substitution factor" of 0.5 (i.e., non-physician providers trade off for physicians at a rate of .5 physicians per 1 non-physician provider). This scenario is modeled for the year 2005.

Conclusions

It is widely agreed that the spread of managed care and competitive pressures in the health care arena are altering health care workforce requirements. The research conducted in the development of the Integrated Requirements Model, and the six scenarios to which it has been applied in the contractor's report, shed light on how requirements for primary care practitioners are being affected.

Exhibit 4 displays aggregate staffing ratios for each of eight delivery settings, standardized to the total 1995 population. One of the key features of the IRM staffing models is that they adjust automatically to changes in the age/sex composition of the population. Thus, to make fair comparisons, they must be applied to a standard population. The 1995 national population was chosen for this purpose. Ratios in this exhibit represent practitioners per 100,000

population implied by the staffing models, assuming they are applied to the total U.S. population.

Examination of these standardized staffing models suggests that:

- Primary care staffing ratios are not affected nearly as much by managed care as they are by differences between insured and uninsured and between urban and rural populations
- NPs and PAs are used somewhat more extensively under managed care
- With the exception of NPs, staffing ratios are less for uninsured populations
- PAs treat a disproportionate share of rural populations.

Exhibit 4: Primary Care Practitioners per 100,000 Population: 1995

Setting	PCPs	PAs	NPs	CNMs
Urban Staff HMO	84	5.5	12.0	1.9
Urban IPA HMO	92	3.9	10.8	1.4
Urban Fee-for-Service	86	3.4	9.5	1.7
Urban Uninsured	46	1.9	9.0	0.8
Rural Staff HMO	55	12.9	7.8	2.0
Rural IPA HMO	66	9.3	8.2	2.0
Rural Fee-for-Service	61	8.4	6.9	2.1
Rural Uninsured	31	4.7	6.3	0.8
TOTAL U.S.	78	4.5	9.6	1.6

Based on these observations, the spread of managed care alone can be expected to have relatively small effect on primary care practitioner requirements, except possibly for PAs and NPs. On the other hand, changes in the size of the uninsured population could significantly impact requirements for all practitioners except NPs. These deductions are supported by the scenario results described below.

Exhibit 5 summarizes findings from the scenario analysis. It shows the increase in practitioner requirements for the year 2005, relative to 1995 levels, which are shown in Exhibit 4 under

each of the six scenarios. It is interesting to compare these percentage increases to the 9.4 percent increase in the U.S. population over the same period.

Exhibit 5: Changes in Year 2005 Requirements Compared to 1995 Levels by Scenario

Provider	Status Quo	Baseline Insurance	High Managed Care	Universal Coverage	Equal Access under Universal Coverage	High NP/PA /CNM Use
Physicians	10.4%	11.5%	12.1%	20.3%	22.7%	-2.2%
PAs	11.4%	15.1%	20.6%	30.7%	33.3%	130.0%
NPs	12.3%	15.4%	19.2%	21.2%	23.6%	130.4%
CNMs	1.8%	-0.3%	-1.4%	9.5%	11.7%	99.3%

The results of the status quo scenario show that, in the absence of changes in insurance distributions and staffing models, the requirements for PCPs, PAs, and NPs do little more than keep pace with population growth. Because of the lack of growth in the population of females of childbearing ages, the changes for CNMs are far less than the growth in the population.

The baseline insurance projection and high managed care scenarios represent varying degrees of increase in HMO penetration, with emphasis on IPA model HMO growth. Given current staffing model estimates, the spread of managed care has little impact on PCP or CNM requirements, but does result in a significant increase in PA and NP requirements. For example, in the high managed care scenario, PCP requirements grow by about 12 percent from 1995, whereas they grew by over 10 percent with no growth in managed care. On the other hand, PA requirements grow by over 20 percent under high managed care and by less than 12 percent with no managed care growth.

Under universal coverage, requirements for all practitioners except NPs increase significantly. This was predicted from examination of the staffing models, which show that all but NP staffing ratios are significantly less for uninsured populations. Although not shown in the exhibit, the detailed scenario results show that covering the uninsured results in an increase of about 7 percent in PCPs, 8 percent in PAs, 2 percent in NPs, and 11 percent in CNMs. Augmenting universal coverage with a program to equalize access to care for otherwise underserved populations results in an estimated increase in practitioner requirements of 2 percent above the straight universal coverage scenario.

The final scenario shows that a hypothetical increase in the productivity ratio of non-physicians from .40 to .50, combined with a doubling in the use of non-physicians, reduces

physician requirements to slightly under 1995 levels. Of course, this conclusion hinges on the assumption of a .50 productivity ratio. The reduction in physician requirements would be even greater if the productivity ratio were greater.

These scenario results suggest that the spread of managed care does not dramatically alter primary care practitioner requirements unless there are other forces also causing changes in current staffing models. Compelling empirical evidence as to where staffing models might be headed was not found. Data on HMO staffing, when not rendered useless by definitional problems or data gaps, tends to show wide variations in staffing patterns. It is not possible to draw any conclusions on where best practices may be headed.

Review of the literature suggests that while it is feasible to organize a practice in which non-physicians are nearly as productive as physicians (a substitution ratio near 1.0), this is not the norm. Instead, non-physicians tend to spend more time with their patients, and, as a result, cannot care for as large a patient population as a physician can. While there is undoubtedly a wide variation in substitution ratios found in current practice, a value of .40 seems to be in the middle of the range of estimates.

This .40 ratio could reflect the fact that PAs and NPs cost about 40 percent of what a primary care physician costs and, thus, they can be about 40 percent as productive (i.e., spend a little more than twice as much time with their patients) and still be cost effective. It seems possible that aggressive, bottom-line-oriented HMOs will ultimately push for greater productivity from their non-physicians and drive the substitution ratio upward. However, no empirical evidence of trends in this direction was found. The high PA/NP/CNM use scenario is, therefore, hypothetical rather than a firm prediction of where the market is heading at this time.

The user-friendly personal computer implementation of the IRM allows for varying model inputs and parameters. It is designed so that requirements can be forecast under an unlimited number of scenarios through such variations.

VI. Recommendations of the Workgroup

Key Findings

The deliberations of the Joint Workgroup on Primary Care Projections resulted in a number of key findings that helped to set the stage for its overall recommendations and possible future work. Among these were the overall finding that the Federal Government plays a key role in both the requirements for and supply of the primary care workforce. As such, it must apply its role in a manner that optimizes the cost-effectiveness of that workforce.

With respect to the requirements for primary care providers, the workgroup found that the health care system is moving rapidly toward a predominance of managed care service arrangements, and ultimately, universal coverage. The four primary care provider types—primary care physicians (PCPs), nurse practitioners (NPs), physician assistants (PAs), and certified nurse midwives (CNMs)—are crucial to the cost-effective delivery of primary care services and relevant to both the current and emerging health care system.

The model developed by Vector Research, Inc., for integrated requirements for the primary care workforce was considered a significant beginning approach to modeling primary care workforce requirements. As such, it would benefit significantly from continuing refinement and the introduction of improved and updated data. The workgroup endorsed the report and work of the contractor.

Throughout its deliberations, the workgroup found that a narrow notion of requirements for primary care services, particularly one in which demand was the sole consideration, would result in ignoring significant unmet needs in the overall population. Particularly concerned with the needs of those individuals whose access to services may be compromised on the basis of location, income, culture, race or ethnicity, the workgroup noted the need for more extensive work in this area both within and beyond the scope of the contract.

The importance of a workforce that is culturally competent and reflects the racial and ethnic diversity of the peoples of the United States was emphasized by the workgroup. Members recognized that the current workforce was not yet sufficiently culturally competent to meet both the demands and needs of the current and emerging population, nor was it adequately representative of the ethnic and racial composition of the overall population.

With respect to the interface among the four provider groups, the workgroup found that there were compelling reasons for enhancing working relationships at all levels, the most important of which was the provision of cost-effective primary care. The workgroup viewed itself as a model of the type of national, interdisciplinary collaboration that is essential to developing sound national workforce development. Similar collaboration at state and local levels—within

and outside of the care context—are particularly important during this time of dramatic health systems change.

Workgroup members found that, in addition to sharing a common base of primary care practice, each type of provider offered unique characteristics that were complementary to other disciplines. The term "substitution" was problematic, particularly when used to convey a one-way substitution of non-physician providers for physicians as a mechanism for providing a partial array of medical care. This view implied that non-physicians were "stop-gap measures" offering no other essential functions unique to their roles. The workgroup emphasized that all of the providers were significant, permanent contributors to primary care. The unique contributions of NPs, PAs, and CNMs—particularly those relating to health promotion, counseling, teaching, disease prevention, and reaching hard-to-reach populations—are critical components in the emerging health care system and should be emphasized.

A number of other key providers, such as public health and school health nurses, were essential to the provision of primary care throughout the health care system. While these providers were not included in the requirements modelling process, future analytic and planning work should reflect their contributions. Also to be considered in future work is the role of specialty physicians, an issue which will continue to influence primary care.

The workgroup specifically recognized the importance of the Bureau of Health Professions (BHP) and its Divisions of Medicine and Nursing in the ongoing national efforts to effectively plan and shape the primary care workforce. It commended the bureau and division directors for the vision involved in developing this pioneer joint workgroup activity and emphasized its importance as a model for national collaboration between medicine and nursing.

The workgroup also noted that both joint and separate actions of COGME and NACNEP were fundamental to implementing these recommendations. Methodologic approaches to workforce development needed to be both interdisciplinary and discipline-specific. The existence of disciplinary councils for medicine and nursing and their analytic and planning activities were crucial to the ongoing enhancement of the effectiveness of each specific discipline and would be instrumental in carrying out the recommendations of the workgroup. Continuing collaboration between the two councils should focus on specific issues of national significance and joint concern. The workgroup indicated that this would result in ad hoc, expertise-specific types of collaborative arrangements, rather than one type of ongoing "bridge" or formal liaison arrangement between the two councils.

Recommendations

The Joint Workgroup on Primary Care Workforce Projections developed the following recommendations to advise the Federal Government on its crucial roles in the continuing planning for and development of the national primary care workforce. These recommendations

reflect the deliberations and findings of the workgroup and are organized into four sections. The first section focuses on the overall role of the Federal Government in the planning and development of the primary care workforce. The second section, which also focuses on the overall Federal Government, is specifically concerned with primary care workforce supply. The third section provides advice to the BHPPr. The recommendations found in the final section focus on COGME and NACNEP. The recommendations follow.

- I. The Federal Government continue to recognize the national significance of interdisciplinary workforce planning and development through:**
 - a. Supporting and conducting ongoing workforce analytic activities that adequately describe the supply, distribution, diversity, mix, and forces involved in the shaping of the key health workforce groups, including physicians, nurses (both basic and advanced practice), and PAs
 - b. Supporting and conducting both discipline-specific and interdisciplinary workforce planning activities that examine integrated workforce requirements and their implications for the supply of each key primary care discipline
 - c. Supporting programs of national scope in primary care workforce development for each of the key primary care disciplines that link federal funding for health professions education to the findings and recommendations of the report
 - d. Supporting the ongoing study of the use of and interaction among health care providers and the implications of the findings of such research for future workforce development. Include research on the use of health care providers beyond physicians, PAs, and advanced practice nurses in the provision of primary care and its impact on the core primary care providers studied by this joint workgroup
 - e. Supporting demonstration projects of national significance aimed at discovering new mechanisms for adjusting the national health workforce supply, including ways to effectively decrease the overall supply, adjust the mix, and enhance the overall ethnic and racial diversity of the workforce
 - f. Supporting the ongoing gathering and analysis of key demographic, health care use, and overall health services development data to enable the critical updating and validating of the iterative integrated primary care workforce modeling process developed by the BHPPr, as described in this report
 - g. Supporting collaborative work with and technical assistance to States, regional bodies, research and educational institutions, and professional organizations to

foster the development of integrated primary care workforce planning and enhancement activities at national, regional, and State levels

- h. Widely disseminating this first joint report of the COGME and the NACNEP and integrated workforce requirements model.

II. The Federal Government initiate health workforce supply-related adjustments in response to the likely integrated primary care workforce scenarios through:

- a. Analyzing the implications of these scenarios for each of the key health disciplines' supply pipelines
- b. Fostering the development of both discipline-specific and interdisciplinary educational strategies that enhance the function of collaborative, primary care teams
- c. Developing discipline-specific plans to help guide the production of new health professionals, recognizing the importance of responding to workforce requirements as a primary consideration
- d. Developing discipline-specific plans to enhance the ethnic and racial diversity of the health workforce in response to the changing primary care needs and demands of the population
- e. Working collaboratively with and providing consultation and technical assistance to States, educational and research institutions, and professional organizations to enable strategic workforce development.

III. The BHPc continue to serve as the national focal point for health workforce analytic, planning, and development activities in general and, with respect to the primary care workforce, strengthen their capabilities in the following areas:

- a. Discipline-specific workforce surveillance activities describing actual and emerging supply, distribution, mix, diversity, and production mechanisms for the primary care workforce
- b. Discipline-specific and integrated analytic and planning activities relating to the primary care workforce
- c. Analytic and planning support and professional consultations to COGME, NACNEP, and joint COGME-NACNEP workgroup activities.

IV. The respective national advisory councils, COGME and NACNEP, continue both joint and/or individual workforce development activities in the following areas:

- a. The role of primary care providers in the ongoing assessment and improvement of the quality of primary care in the emerging health care system
- b. The importance of and improved mechanisms for enhancing the racial and ethnic diversity in the primary care workforce
- c. The overlapping and unique roles of physicians, nurses, and physician assistants in the delivery of primary care in the emerging health care system
- d. The impact of physician specialist practice on the overall primary care workforce
- e. The roles of individual providers, the patient, and the family in the development of primary care teams.

Appendix A:
Commissioned Papers

**THOUGHTS ON COLLABORATION
BETWEEN PHYSICIANS AND NURSES**

April 1995

**DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
Health Resources and Services Administration
Bureau of Health Professions**

TO: Participants in Workshop on Primary Care Education and Collaborative Practice
FROM: Claire Fagin
Date: April 25, 1995
SUBJECT: Thoughts on Collaboration between Physicians and Nurses

On a beautiful, warm for March day, I was walking from our university hospital to the School of Nursing and passed the Medical Education Building. Up to that point, almost everyone I passed had eye contact with me, many smiled to me knowing me personally or from photographs, and others just smiled because that is our way at Penn, particularly on a gorgeous day. There were two notable exceptions, and a barely noted flash went through my mind that they were medical students. As I got to Med Ed, a group of medical students came out. That's what heightened the previous flash since the behaviors were identical. All of them had eyes only for themselves. Even if walking alone, the student appeared fixed on no eye contact with anyone, and whether they were in pairs or groups, they behaved like a closed group. This is a familiar experience to anyone who works in or near an academic health center, but in **thinking** about the subject of your Workgroup on Primary Care Education and Collaborative Practice, it had more resonance than usual. My thought was "it all starts here."

We happen to be focussing on nurse-physician relationships. Nurses get bogged down with this focus, since it leads to a sense of continuing frustration and disappointment which eventually leads to hostility. The fact is that the behaviors young physicians and physicians in training exhibit have little to do with nursing qua nursing and everything to do with everyone else in their orbit not worthy of notice. Unfortunately, since young nurses are more often in their orbit than others and are extremely desirous of the idealized collaborative relationship, they take physician behaviors more personally than do others who are less dependent on having colleagues' notice and respect.

I know that you have numerous recommended readings for this conference, including my own paper (1992), Mechanic, Aiken (1992) and others. I hope that you will have an opportunity to review a recent book on nurse-physician collaboration (Siegler & Whitney, 1994). This book shares lessons learned in a variety of interdisciplinary practices and programs and offers both cause for optimism, as well as problems for solution. In addition, several research articles have appeared in the past two years supporting collaboration in practice, research and standard setting. Examples include an article discussing the benefits of collaborative practice in the ICU (King & Lee, 1994). This article describes the work of nurses and physicians in a Navy ICU. In this study, nurses perceived that they were involved in collaborative practice at a moderate level, with physicians reporting collaborative practice to a greater extent. Others have reported positive collaborative experiences in both practice and research in neurology and neurological nursing at a unit of Clinical Center, NIH (Graham, Harnett, Harrison, & Considine, 1994). Patient care benefited from these relationships. Another article (Walton, Jakobowski & Barnsteiner, 1993) describes the benefits of a model of clinical nurse specialists responsible for a defined patient

population in a tertiary care children's hospital and reporting jointly to the director of nursing practice and the physician chief of the medical/surgical division. The position was jointly funded. The investigators found that these services had a direct and positive effect on quality, cost, and patient/parent satisfaction. Inpatient and home care were efficiently orchestrated, and length of stay and complications were reduced. The relationship was difficult to work out, but the results were believed to be worth the effort. Outcomes of care were integrated between the disciplines, and a greater understanding of mutual and independent issues evolved. Further, "a seamless interface between care requirements and care approaches..." resulted. The final example I will cite is the description of a collaborative approach to standards and practices which enabled operating room staff to develop a shared philosophical approach to patient care (Krueger & Mazuzan, 1993).

So, if everything shows that collaboration is good, why is it so rarely seen and even more rarely taught from the beginning of both nursing and medical education? All evidence shows improved patient outcomes, often reduced cost and complications, more satisfied and, therefore, more constructively communicating staff. Further, nursing and medical groups have focussed on the topic for years and have tried to promote one or another model of education for collaborative practice. The latest of these attempts came from the Pew Health Professions Commission (O'Neil, 1993) which proposed strategies to help health professions schools meet changing needs. Addressing barriers to change, the Commission pointed to professional identity and territoriality and stressed interdisciplinary strategies as the only viable pathway to address — complex problems.

Are the current changes in the health delivery system and in medical and nursing education harbingers of change in relationships of these two essential provider groups? Are these changes sufficiently threatening or, perhaps, exclamatory to create radical transformation in entrenched patterns of thinking of academics and practitioners? I have said before that I am an optimist. Some points in my previous paper bear repetition here. I commented there and believe strongly that "every one of us who has been in medicine and nursing has had some wonderful experiences with each other which have transcended these barriers and have offered a glimpse of what is possible when collaboration occurs. The personal satisfaction of a mature relationship that, incidentally, is neither love nor friendship, the improvement of a patient in actual health or in comfort, the understanding of a family, and the removal of system barriers that make our work so difficult are extraordinary experiences. Any of us who has not had that kind of experience during our work lives is unfortunate."

I would like to pose some questions for your thinking on the future of interdisciplinary collaboration.

1. Have we defined the problem correctly?

When we examine the intransigence of the problem, despite long time efforts of professional associations, foundations, and individuals, it should give pause. Perhaps we need to take a new look at what we are describing and, therefore, what solutions we are recommending. I started by commenting about academic health centers and the opaqueness of physicians in training to the people in their orbit. If we believe this is a problem, then we must solve it. If we see this as an important developmental stage, we need to recognize it, prepare

for it, wait through it. but with awareness of three things: what do we do directly and indirectly during this developmental stage; what comes next; and how do we position ourselves for the next stage. It may well be that at the earliest stage, interdisciplinary education, at least as we have attempted it, is inappropriate.

Old definitions of problems rarely work to find new solutions. I suggest we start by parsing out a few new definitions.

2. What has worked in the past; have successful projects been replicated? If not, why not? If yes, where? What has not worked in the past, and how many of us are still trying to emulate experiments which failed? For example:

-- **education:** what levels of nursing and medical students work best together in learning situations? Although there have been a few successes, on the basis of age and experience, starting freshmen nursing students with first year medical students generally has not been considered the best combination. However, nursing populations are changing, and students often are older and have previous college education. Therefore, educational experiences might be rethought. What are possible "sweeteners" that would make educators more amenable to taking a fresh look at interdisciplinary education? Are there current stimuli in the field that will encourage educators to seek collaborative learning experiences for their own self interest? Community health and primary care are promising arenas for interdisciplinary education.

-- **research:** collaborative programs in research have been the most successful of all efforts. It is natural for academics to collaborate in research when there are common interests. How can we disseminate these programs to a wider group of nursing and medical professionals?

Clearly, our organizations and journals have to show an interest in the research and its outcomes to make wider dissemination possible. Further, the "status" of this kind of research with each discipline will determine the success or failure of efforts to disseminate the work at meetings, conferences, and in publications. Can the status question be addressed during this time of shrinking research resources and stable or shrinking faculty positions?

-- **practice:** there have been many successful models of interdisciplinary practice. These have generally been driven by foundation funding, but have built on examples from the field. As with examples of successful research experiences, these practitioners need to articulate their work for a wide audience of lay and professional people. Why has the press not been more interested in these examples?

3. How do you think others, e.g. administrators, patients, other health professionals, influence the working alliance between physicians and nurses?

-- are the perceptions and expectations of others barriers to practice?

-- do the medical and nursing practitioners explain clearly to these audiences what they are doing and the benefits thereof, or do they simply take for granted that people understand? Or, even worse, do they see any value in the understanding of important others? This latter possibility will become even more important in the new health care environment.

4. Are there issues between the two professions that we find undiscussable?

Recently, I spent an evening with a group of graduate nursing students and engaged in a dialogue of issues that interested them. Inevitably, the subject of why there is not more

collaboration in our medical center came up. The questions and comments had the usual plaintive note and were, for the most part, hostile to physicians. There happened to be a first year medical student in the group. She identified herself and told of her interest in pursuing interdisciplinary cooperation. Her sister was a Penn nursing graduate with a MSN and did not think her sister was suited to a career in nursing but was very worried when her sister chose medicine. They are very close, and the nurse asked, "Will this ruin our friendship? Will you become like them towards nurses?"

I shared with these students our experiences in attempting to develop an interdisciplinary course for senior nursing students and first year medical students. The nursing faculty and students were the most resistant to this experiment. Yes, their reactions were based on long experiences of suffering from the "invisible" syndrome that I have described elsewhere. But, the kind of dysfunctional relationship that our two groups have formed over time lends itself to just this kind of push-pull problem. When one group makes a sincere effort to engage, the other is still responding to an old hurt. When the other starts to realize that a mistake was made, it is already too late. This is a familiar problem to anyone doing family therapy or marriage counseling. The problem for us is that the patient ends up the loser as communication problems prevent sharing of important information, perceptions, clues, and experience.

Look together and frankly at what some of the undiscussable issues are. One way to do this is to think about the most outrageous things you have ever heard said about the other group when physicians or nurses are amongst themselves.

5. Are there current forces driving change in the interdisciplinary equation?

Without spending time reiterating what we all know about the changes in the health care marketplace, let's agree that the changes in control, in payment, in the need for primary care practitioners, and in demographics will promote new alliances of nurses and physicians. Our experiences at Penn tell the story quite well.

a) After years of unsuccessful efforts to develop collaborative practices with physicians at the Penn Health Systems and the Hospital, there is now a dramatic shift in interest. Yes, nursing continued to reach for this interest and turned away many other "suitors" who recognized earlier the potential of the clinical nursing faculty to enhance their offerings. However, the School's administration was persistent about staying with Penn Medicine if this would work out. Independent practices were developed so that the community, the programs and the faculty would not suffer in the delay, but optimally the School of Nursing desired the major practices to be at Penn. It appears that significant progress has been made within the past month and that several collaborative practices, as well as independent consultative practices, will move to the campus or be affiliated with Penn Health Systems.

b) There is an enormous market for Penn's advanced nursing practice graduates. This includes nurse practitioners of all types; tertiary care practitioners and midwives. Further, many of the potential employers are physician practices and health maintenance organizations.

Does this mean that there is a sudden new benevolence towards collaborative practice? Not in the least. What it means for now is that there is a mutual need for nurses and physicians to work together to meet the needs of patients in our communities. Where the physicians are in control, they are saying "look, like it or not we need to work together." Where others control

the money, physicians and nurses are no longer fighting for territoriality and control since physicians have already lost control to managers. Therefore, the possibility for alliances is much greater than it has ever been because of the shared concerns of the two professions about patient care and quality.

Finally, our commonalities - physicians and nurses - are often part of what defeat us since they make it so difficult to face our differences and respect those differences. Differences between us, as with others, often engender distrust, particularly when these differences reflect different values and different backgrounds. Each of us comes from a community of professionals with strongly held values and perspectives. We need to be able to debate these perspectives with each other and separately as we continue our self and other education. This will take participation with each other, but even more difficult, it will take careful listening and making sure that we are understanding what the other is saying. These communications will move us towards new solutions, that are practical rather than abstract, and will help us move towards a new reality. All will be served.

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**TERRITORIALITY AND POWER IN THE HEALTH
PROFESSIONS**

DeWitt C. Baldwin, Jr.

**Working Paper prepared for the
COGME/NACHEP Workgroup on
Primary Care Workforce Projections**

April 25-26, 1995

Territoriality and Power in the Health Professions*

DeWitt C. Baldwin, Jr.

Introduction

Although medicine traditionally has tended to view health care as a one-to-one transaction between physician and patient, the collaboration and support of nursing and other providers has always been essential. Indeed, one of the most remarkable developments in the field of health care during the past several decades has been the rapid proliferation and growth of new health professions and occupations. Where physicians once outnumbered other health workers, the latter now greatly outnumber physicians.

Garfield has noted that in 1900 the medical care system consisted largely of the patient, the doctor with his black bag, and a hospital staffed with nurses. By 1935, the system had expanded to include a number of medical specialists and technicians both inside and outside of the hospital. By 1970 the number and variety of medical technologies and personnel had escalated to a point where both costs and number of potential provider-patient interactions were causing concern. Concomitantly, the kind of patients entering the system had changed from persons who were "very sick," to include those whom Garfield termed the "early sick" and the "worried well." He pointed out that a single entry system built for the "sick" did not effectively serve the needs of the "well," and called for a greatly diversified system which would better utilize existing resources, foster a more efficient match between patient needs and provider skills, and increase collaboration between health providers. The

* Throughout this document, the terms medicine and nursing will be variously used in one or another of their several meanings - as professions, as disciplines, as organizations, as functions, and as enterprises. Occasionally, the term medicine (as enterprise) may include both medicine and nursing, without any implication of superiority or sovereignty. Similarly, the paucity of specific references to nurse practitioners, certified nurse mid-wives, and physician's assistants should not be interpreted as in any way denigrating or discounting these important partners in health care. It is hoped that in most cases, the meaning will be clear from the discussion.

situation also clearly called for interdisciplinary educational programs to encourage and enable health professions students to work together effectively in the delivery of comprehensive care.

Since then, the U.S. has seen a rapid progression in all these areas so that the health care system today looks substantially more complex and differentiated. Such have been the opportunities and demands of this growing complexity of medical care that over time the unitary concept of the physician began to be split apart into various specialties, each with a powerful claim to a special identity, status, autonomy and essentially monopoly. Throughout the "golden age of medicine" in the 1950's and 60's, these special interests proliferated at an increasing rate, leaving the generalist far behind in income and prestige. New specialty associations diminished the exclusive voice and power of the American Medical Association (AMA) and threatened the integrity of the profession with a split between these semi-autonomous "elites" and the rank and file generalists. Throughout this period, medicine continued to demand and hold power and authority in health care decisions, although clear signs of a growing desire for a place in the sun were emerging from the various workers in the health enterprise, who meanwhile were specializing themselves.

From medicine's standpoint, all was going well. Even the threat of Medicare - fought tooth and nail by organized medicine - not only brought unparalleled wealth to physicians, but appeared to reaffirm medicine's traditional autonomy, (see section 1801 of the Medicare Act with its assurances that the federal government would not exercise "supervision or control over the manner in which medical care services were provided --- or over the

administration or operation of any -- institution, agency, or person providing health services.") Unfortunately, over the next several decades costs rose beyond expectations and prompting various legislative mechanisms for control over finances - to little avail.

All this has changed. The past few years have seen a "buyers revolt" on the part of the government, private payers and corporate interests as they have asserted increasing pressure to reduce costs. The result has been a massive reorganization of health care, and the emergence and rise of a variety of new practice and organizational arrangements of "managed care", such as HMO's, IPA's PPO's, TPA's, and ISN's. Simultaneously and largely as a result of these new players, there has been the emergence of a variety of rules governing (and constraining) the work of medical care, including practice protocols, and treatment guidelines. Quality assessment and physician performance, long prerogatives of the profession, have become accountable to outside interests through a variety of assessment tools which rate and regulate physician behavior. Paradoxically, this has led to the emergence of a new set of "elites" in medicine, who have chosen to collaborate in this process as "experts" in the administration as well as the definition and assessment of health care. While these new "elites" may be viewed as attempting from within to maintain some professional control over the direction of changes in health care, the possibility exists that their efforts may be coopted by outside interests under the banner of rationalization, thus denying the rank-and-file physician appropriate clinical discretion over the uncertainties and vagaries of patient care that exist along the front lines of practice. Of more than passing

interest is the rising number of nurses who now administer such standard-setting procedures and thus sit in judgement of physician performance.

These changes have rendered vulnerable the power and authority of the house of medicine and threatened its long history of status and security. For the first time, young physicians coming out of training in some specialties are unable to find positions and payment commensurate with the expectations of the past. Predictions of oversupply, once made on the basis of theoretical models and expert panels under physician leadership are now stridently supported by emerging data on staffing patterns from managed care organizations. The data from these sources carry added power by virtue of the real and predicted growth in "market share" of these organizations over the coming years. The net message is that the greater need is for primary care, and that in many, if not most, cases these services can be effectively delivered by others, such as nurse practitioners (NP), physician's assistants (PA) and certified nurse midwives (CNM). Legal recognition and acceptance of this broadening of skills and services is to be found in the gradual expansion of nurse practice acts throughout the country. At the same time, successful judicial and legislative challenges against the exclusive power and authority of medicine have been made by chiropractors, osteopaths, and a variety of alternative health providers, aided by the public's suspicion and disillusion with medicine and an apparent rise of populism reminiscent of the Jacksonian Era.

What has emerged is the picture of a beleaguered house of medicine, weakened from within by in-house divisions and the rise of new elites, and assailed from without by the

forces of the state and corporate interests and the latter's assertion of power and control over the conditions of medical work by means of practice guidelines and protocols, as well as medical effectiveness and outcome research. Such control challenges the very core of medicine's identity and claim to professional autonomy. Similarly, mounting challenges from nursing and the other health professions and occupations have made the boundaries of medicine's traditional power and "territory" an area of dynamic tension and change.

Territoriality

It should not be surprising that the relationship of nursing and medicine has been characterized by territoriality and power issues. Traditionally, each has been identified with strong gender differences, educational disparities, pronounced income differentials, areas of overlapping roles and functions, in-house divisions and boundary issues.

The phenomenon of territoriality predates human existence. Indeed, much of what we know about this ubiquitous concept comes from studies of animal behavior. It is observed at many levels and across many species, from slime molds to insects, from fish to birds and from animals to humans. A territory is a space - be it in air, water, or on earth - that is identified by one or another species as its own, and is defended as an exclusive domain against others, who are regarded as intruders or threats. Territoriality also refers to the inward compulsion to possess and defend such a space. Indeed, the drive to possess has been called "the territorial imperative". A further observation is that possession of a

territory apparently imbues the owner with heightened energy and resolve, so that challengers are usually repulsed even when much larger.

Not all species are territorial. For many it would be self-destructive, as for example, grazing animals that need to range widely to survive. However, it is apparent that homo sapiens is highly territorial - not primarily for commonly assumed economic or political reasons - but from some seemingly deep-driven need to inhabit and possess an identified space in exclusivity. This can be observed at individual, family, group and national levels. In humans, the concept of territory has evolved toward highly symbolic ends, such as power, prestige and possession.

There are additional aspects of territoriality of possible relevance to the issues at hand. For the most part, animals only reject intruders of their own species. A wolf is not concerned with an eagle or even a marten that enters its territory, it only repels other wolves, and only those who are not members of its own family. It will welcome the presence of a herd of deer or a warren of rabbits. The classic way of establishing territory is by "marking" it with distinctively scented urine which all other wolves learn to recognize. Maintaining the territory requires monitoring - a regular round of the perimeter, refreshing the scent as a way of informing or warning other wolves not to intrude. Howler monkeys use sound as a marker, since their territory is in the trees. Humans also mark their territory. Whether it is by the Great Wall of China or the forts of the U.S. Army during the conquest

of the West, they are designed to tell others of the species that the inhabitant intends to stay and will repel all attempts to be dislodged.

The idea of territory classically has involved a physical space or place. Human beings, however, have evolved a vast complex of territorial forms, ranging from real property - land and possessions - to more esoteric and symbolic forms, such as creative intellectual, artistic and aesthetic properties, all formally protected by laws and legal precedents. In today's world of business, companies use legal "markers" like patents, trade marks and copyrights to defend their commercial or intellectual property and they compete vigorously in the media and marketplace for "market shares" that represent the new "territories" of business. At times, one business may buy or aggressively take over another and its properties, although the practice of willing (or unwilling) mergers uniting two properties - is becoming common. Note that the word "property" now stands for territory and may represent many intangible as well as tangible things.

Even social issues and political agendas may become invested with territorial qualities. Many observers have called attention to the process of "medicalization" of social problems and issues, such as poverty, violence, deviance, and learning disabilities that have been coopted by medicine as it has expanded its hegemony. To a large extent, this has been less an artful power grab by medicine, than a gradual defection by society, partly out of a sense of frustrated failure, as well as a forlorn faith in the promised potential of science to solve all problems. This process has undoubtedly been accelerated by the World Health

Organization's definition of health as "complete physical, mental and social well being". The "medicalization" of areas like childbirth, claimed by medicine and the hospital in the first half of the century and now being partially returned to the nurse midwife and to the birthing center and home, suggests that territorial boundaries can be in flux. All this is meant to suggest that not only are new territories constantly being created, but that both the concepts and the existence of traditional territories and their boundaries are constantly changing.

There may be lessons to be learned, in understanding, if not in strategy, from this brief discourse on territoriality. First, the establishment and defense of territory seems basic to most forms of animal life. Second, the owner or proprietor of a territory generally is in the power position as far as possession is concerned. Third, those seeking territorial control will either have to defeat the incumbent or find another place. Fourth, unless such territorial boundaries are regularly maintained and reinforced, predators will be encouraged to claim unworked or abandoned areas, leading sooner or later to potential conflict. In the animal world, the purpose of boundary marking or maintenance is to avoid rather than promote confrontation and conflict.

All this bears some relevance to the current state of the relationship of medicine with nursing and the other health professions and occupations. What was once a comparatively simple picture of authority and dominance is now complicated by a number of societal forces. Some of these are more immediate and insistent, such as those from the marketplace,

the public and the government. More significant in the long run, however, may be the various expressions of the underlying democratic process, such as feminism, consumerism and civil rights. While the former are aggressively and autocratically setting the agenda and defining the battleground of the current crisis and, as such, demand the serious attention of both medicine and nursing, the latter represents a pattern of inexorable evolution toward egalitarian relationships that carries a moral imperative and can only be regarded as healthy in the long run.

Implicit in the above discussion have been the concepts of power and dominance. The possessor or incumbent is a "have" and the aspirant is a "have-not" - at least with regard to the disputed territory or property. As we have seen from the animals, the possessor nearly always succeeds in keeping possession unless he/she/they are weak, disabled, impaired or abandon the area. The problem is that unlike animals, humans "haves" seldom seem content with what they already have, but seek ever to enhance and augment their holdings, even seeking control over those of "have-nots", while the latter are constantly testing the boundaries of their more fortunate rivals. If, in the present case, nursing desires some portion or access to territory currently held or claimed or previously possessed by medicine, it must successfully challenge in one of the following ways: (1) by coopting or taking over medical functions by force or subterfuge, (2) by seeking to gain the support of powerful allies such as the law, the courts and public opinion, (3) by seeking out newly defined or abandoned territories, or (4) by substantially shifting the argument to a different level or in a different direction, hoping to develop a consensus which will enable them to work together in

a harmonious and integrated way. In assessment, the first appears least professional and probably will lead to ugly confrontations with medicine, the second is largely where the relationship stands currently. The third appears to offer considerable promise, especially in areas apparently bypassed or deserted in medicine's rush to embrace technology, while the last appears to be most consonant with the high moral calling and service commitment of both professions.

This more modern and sophisticated picture of the dynamic and changing nature of territories leads to one further speculation. Is it possible that due to the progressive "medicalization" of society, the enlarging concept of health, the exploding knowledge base of science and the expanding triumphs of technology, that territory once claimed by medicine has become simply too large and complex for physicians to manage? Indeed, the explosion of health professions and occupations, especially since the 1950's, attests to the fact that the vast arena of health care requires far more than one profession to be involved and mitigates against the claim of any one group to be in charge of all transactions and at all times. Within such a concept of "unclaimed," "unoccupied," or "abandoned" territories may lie the possibility of "new" and emerging areas of competence and performance for nursing, such as those of AIDS, geriatrics, prevention, and health promotion, as well the more traditional ones of caring and health.

One major contribution of the Community Health Center movement of the late 1960's was the further development of the interdisciplinary team concept, pioneered in this country

by Cherkasky and Silver. Under pressure from legislation in the War on Poverty to deliver primary care to the underserved, physicians and nurses along with other health workers found a way of working cooperatively and collaboratively in community settings to provide services to a wide range of patients as teams, where the notion of expanded functions and overlapping roles, as well as the concept of shifting leadership became both an ideal and the norm. Roles and responsibilities shifted with the needs of the patient, the physical setting and the demands of the situation. Primary care physicians, nurse practitioners, social workers and indigenous or family health workers espoused and performed to an egalitarian ideal of teamwork in the delivery of health care.

Such relationships did not extend to the hospital where the traditional hierarchial model of physician-dominated care still reigned. (Specialized hospital-based teams are efficient, but not egalitarian.) But a significant blow for equality had been struck. Under the pressure of expanded work loads and new ideological imperatives, nurse practitioners and physician's assistants suddenly were encouraged to perform tasks once considered the exclusive domain of physicians. While diagnosis and treatment were still officially reviewed by physicians because of legal constraints, such supervision was often perfunctory. Thus, the idea that the territory of medical work could be shared, and that others could perform many of the tasks previously reserved for the physician became an accepted and a recognized fact. Of course, those in times and places of severe need, such as war or in isolated rural areas, or those oppressed by poverty have long known that when the doctor was not available, others could and did take over.

Thus, a vision of open, flexible, or overlapping territory emerges as one possible area of fruitful discussion and negotiation between health groups striving for a place in the sun. Returning briefly to the metaphor of "territorial marking", rather than provoking conflict and confrontation at the boundaries in passionate displays of power and prejudice, open discussion and cooperation may be a more fruitful way of negotiating border disputes.

All this is not proposed as some zealous ideal, but because of the alternative threat - that some outside force or forces may establish or set such boundaries arbitrarily and irrevocably, or do away with them completely. One should not underestimate this threat, not only to the power and prestige of the health professions, but to their very existence as true professionals with a concern for the welfare of the patient and a necessary degree of control over the content and conditions of their work.

POWER AND AUTHORITY

Power has many definitions and meanings. It may be residual or attributed, kinetic or potential, real or imagined. In general, it means that one party has the ability or means to influence or affect the state or disposition of the other. French and Raven identify five types or bases of power: 1) reward power, or the perception on the part of one entity that another entity has something of value or to be desired by the former that is potentially attainable; 2) coercive power, or the perception of one entity that another has the ability to mediate punishment for the former; 3) legitimate power, or the perception on the part of one entity

that another has a legitimate right to prescribe conditions or behaviors for the latter; 4) referent power, based on the desire for or extent of identification of one entity with another; and 5) expert power, or one entity's perception of the special knowledge or expertise of the other. Of these, the most complex is legitimate power, which involves cultural, social and political dimensions, as, for example, the power established for one entity by a legitimizing agent such as judicial or legislative authority.

Possession of power enhances one's freedom of action and satisfaction; hence it grants independence. In fact, power has been defined as the inverse of dependence - the possessor with the lesser dependency has the most power. Power is often seen as a zero-sum phenomenon, where the assumption is that there is a limited amount available, and that any gain or loss by one party translates into its opposite for the others. Such a fixed view of relationship bodes poorly for the resolution of differences where such views are held.

Authority is the outward recognition of invested power and carries with it the idea of expertise and the ability to influence or direct others. Hauwerwas claims that authority is a political-moral concept, having to do with fundamental issues of beliefs and values. It involves the willingness of people to accept the influence of others in their decisions and behavior based on the attribution of superior expertise and moral responsibility to those person's or institutions. The particular power and authority of medicine derives basically from people's fears of illness, suffering, and death, and their dependance on the imputed

power and promise of medicine to care and to cure. That medicine has sometimes lost sight of this moral responsibility and contract is to be lamented.

Knowledge is a source of power. From religion to medicine, the possessors of knowledge could and did control their less knowledgeable minions. The signs and symbols of that knowledge gave power to the possessor and caused fear and envy in those without them. As the information age emerges, one of the most important sources and forms of power lies in control of information. The power of the media to influence social and political thought is one manifestation. In the field of health and disease, the issue of who controls the information and the data becomes crucial. Whereas the medical profession has long maintained firm control over its knowledge and skills - indeed, intentionally kept them from lay persons and others - and has brooked no exercise of oversight or evaluation from outside the profession, all this is changing. The development of an industry of outcomes and medical effectiveness research has catapulted what traditionally has been a process of discretionary decision-making in a world of medical uncertainty, previously protected and controlled by physicians, into a ledger sheet of physician performance and clinical outcomes.

Any discussions concerning changes in the health delivery system are doomed to parochialism, if they ignore history and its cyclic pattern, as illustrated by the alternating perceptions of workforce over and undersupply in both professions. Current issues also are inextricably bound up in, as well as the result of, changes in the prevailing culture. The fact that the U.S. is at least nominally a democracy defines certain forces as well as an overall

trajectory that cannot be denied. Although a free, white, male, political, economic and intellectual elite established this country in the ideological image of egalitarianism over two centuries ago (with other free, white males in mind!), few people today would grant that this ideal has been realized for all citizens. Much of our history has been characterized by the struggle of various underclasses for even a dim recognition of the shortcomings of our society. Movement toward the emancipation of slaves, workers, women, minorities, and now the patient has been slow and painful, and still to be fully realized.

The inevitable consequence of the democratic ideal is a commitment to broadening the base of equality, a process both described and predicted by Tocqueville. He saw democracy as the ultimate expression of a new form of power centralized in the hands of the people. Placing the power there meant that, in theory at least, all other traditional forms of power and authority were inevitably and forever doomed to eventual decline and overthrow. Thus, despite the evident persistence of inequality and of pernicious power and tyranny in the society, democracy's powerful promise, according to Tocqueville, is that history has been and will be characterized by a progressive equalization of status and centralization of power in the hands of the government and the people. That there is a constant ebb and flow to these forces is not surprising. Thus, the inexorable drive for egalitarianism and the cyclic spiral of its variable achievement must form a backdrop to our discussion.

Nor can this same pattern be ignored among democracy's constituent parts and parties. Shere Hite maintains that the failure of democracy to bring its egalitarian form and

promise to the family has set up a continuing source of tension and conflict between the sexes. It is not mere chance then, that brings the issue of gender into the problems besetting the sometimes contentious relationship between medicine and nursing. While changing rapidly with regard to demographic composition, medicine still remains a largely male-dominated profession at the top, while nursing is still mostly led by and composed of women. Thus, the ever broadening issue of equality between the professions cannot help but be influenced by underlying gender imbalances, both real and perceived.

As a continuing dominant force and presence in the health field, medicine retains vestiges of power from the past. Having successfully routed quackery, marginalized osteopathy and excluded chiropractic, homeopathy, and naturopathy, medicine gained its privileged place through effective alliances with society and the state. In large measure this came about by allaying the underlying fear and anxiety of a superstitious and poorly educated public over illness and death by offering the promise of a fiduciary relationship supported by a special expertise gained through successful coalition with the miracles of emerging science and technology. As experts -- elites if you will -- in an area of unknown if predictable terrors for the public, medicine was granted special privileges in the form of a legislated monopoly.

This had the effect of granting exclusive rights not only in the practice, but also in the business of medicine. Physicians not only could define the content and conditions of their work and the judgement of the results, but also the fees. Having eliminated the competition, they were in charge - at least of the domain of disease and death. As such, they

were also able to maintain a power and authority that was able to resist corporate efforts at the turn of the century and later during the Great Depression to directly hire "company doctors", or to create pre-paid group practices which would provide services for large business enterprises under contract. Perhaps more important, by defining the content and conditions of their work, they were able to achieve a professional status which placed them above and apart from the trade union status of industrial workers and technicians.

At that stage, of course, there was little reason for medicine to be concerned with the status of nursing or the other emerging health professions and occupations. Legal protections, legislative entitlement and cultural legitimacy placed them clearly in authority and, consequently, in power over their emerging co-workers. Supported by the largess of the government and fueled by the incredible advances of their ambitious companions - science and technology - medicine's power only increased. Necessary and required in this enterprise were a massive array of supportive skills and personnel - leading to an unparalleled growth and proliferation of new health professions and occupations.

Professionalism

Early sociological writing in Europe was concerned with the dangers of capitalism and industrialism, and viewed professionalism as exerting a barrier or moral authority against materialistic excesses and bureaucratic control. Physicians, for example, were ascribed altruistic motives which would protect and advance social welfare. This so-called "social

contract" was supported by claims of a fiduciary relationship with the patient and an expertise based on a technical and esoteric body of knowledge that could only be known and applied by persons with a commitment to service and legitimated by a standard educational pathway and a legislated credentialing process, with final acceptance into the membership of a group of like-minded persons. Although it had long been recognized as one of the "learned professions", it remained for medicine's firm alliance with science and technology to catapult it into the prototypical model of a profession.

While there have been cycles in sociological descriptions and definitions of profession, much of the early certainty and idealism has dropped away. Fox notes one rather extreme view which holds that the idea of a profession is nothing more than "a semi-mythic construct, created by members of an occupation who "profess" to have special characteristics, qualifications, and responsibilities; they systematically persuade others that they do, and succeed in having these claims institutionalized in ways that accord them privileged rights and powerful authority".

Greenwood has identified the essential elements of an ideal profession as including (1) a body of systematic theory, (2) client recognized authority, (3) broad community sanction and approval for this authority, (4) a code of ethics regulating relations with clients and colleagues, and (5) a professional culture sustained by formal professional associations. At the same time, he cautioned against using these in any categorical manner and suggested that it would be helpful to look at professionalism as a continuum, ranging from traditionally

accepted, ideal-types of professions like medicine and the law at one end, to a vast army of legitimate and illegitimate pretenders at the other, each seeking to gain the recognition and privileges of the ideal.

While the concept has undergone a great deal of discussion since, much of it based on (aimed at) and critical of medicine, the term has engendered so much confusion and disputation, especially among aspiring groups, that it may be better to simply accept the claim of many, if not most, of the established and emerging health occupations that at some level they merit the sometimes mixed blessing of such a label, and, in the end, allow the court of public opinion to assess their claims.

At the same time, it is not suggested that the baby be thrown out with the bath water. Elements of professionalism remain crucial in the current health care debate if health care workers are to avoid becoming just that - workers. Essential elements include control over the definition of the content and conditions of work, a service orientation, and the maintenance of a fiduciary relationship with the patient or client, including an important advocacy role. While the professions appear to have maintained considerable control over their work, they have suffered substantial losses in convincing the public of their service motivation and fiduciary trust. Regaining moral high ground and the trust of the patient may serve to restore the prestige and power of the health professions and regain the confidence and support of society in what is shaping up as an invasion of Philistines and money-changers into the once-sacred temple of the helping relationship.

It is in the first of these - establishing and maintaining control over the content and conditions of work - wherein lie the problems and the promise of the relationship between medicine and nursing, as well as within each. Medicine's "professional dominance" of the past - and to some extent of the present - appears to be greatly threatened by the cost concerns of corporate interests and by the pressure for accountability on the part of the government and a frustrated public, leading to a steady encroachment by a new bureaucracy. These forces are now accumulating the data, and with it the power, to change and restructure areas of work definition once solely the prerogative of medicine. Limitations in utilization of resources, such as requirements for prior approval, second opinions, lowest level in-house referrals, tighter scheduling, and the threat of payment refusal, as well as limitations on the availability of resources, such as restricted formularies and diagnostic procedures are recently established but effective methods for changing and controlling the work of physicians.

Meanwhile, the other health professions and occupations see an opportunity to carve out portions of the task domain for themselves, allying themselves with the unrelenting drive for rationalization and decentralization of services. Some, if not most, of these make sense; especially if the promise of quality and cost-containment can be demonstrated and sustained. It would be unfortunate, however, if the pressure for work and task redefinition results in even firmer bureaucratic control over the ultimate and unique characteristics of the clinical decision-making and treatment process, so that minor gains for one health profession or one of its constituent members result in greater limitations for all, and inadvertent consequences for patient care. It would be well to remember that the real power now rests with state and

corporate forces and that the enemy is not medicine, although it may be seen as standing in the way. The old statement may be appropriate, "If we don't hang together, we may hang separately."

What will be needed are earnest discussions concerning the nature of clinical work and the definition of clinical tasks and roles in a rational and functional framework, focused on patient care and uncontaminated by organizational agendas. Medicine will have to give up some of its self-righteous sense of dominance and be open to the self-determination needs of nursing and other groups. The doors and drawbridges of ancient castle keeps will have to be opened and information and opinion shared in open and non-judgmental ways. The path will be guided by refocussing on the needs of the patient - not on the images or ambitions of the professional associations. There must be a return to the goals and motivations of those in the helping professions - service. Self interest and self-serving must give way to the needs of society. Only in this way will the public - in whom the power is ultimately invested - act to curb the potential excesses of the new health bureaucracy and once more support the claims of professionals to better serve them.

Nursing:

Nursing is currently undergoing rapid change, accompanied by an accelerating process of professionalization. Aiken lists four factors from the history of nursing that appear to

have influenced this process. "(1) nursing developed as a occupation supportive of physicians; (2) nurses worked primarily in bureaucratic institutions; (3) nurses are predominantly female and; (4) nursing's early educational history was linked to religious orders, with expectations of service, dedication and charity."

While the functions of nursing - care of others, especially the sick and elderly - are as old as history, the rise of nursing and its quest for professional role and status have been relatively recent. The founder of modern nursing, Florence Nightingale, first conceived of a dedicated, educated core of persons trained to care for the sick at the bedside in the latter half of the 19th Century. Prior to that nursing was largely carried out by domestic servants or members of religious orders. Her influence pointed the way towards respectability and recognition, to be achieved through hospital training and a formal curriculum.

The first training programs in the United States opened in 1873, under the direction of hospitals. Their number increased rapidly, from 15 in 1880 to 1105 by 1905. In these settings, nurses provided much of the care, but were subservient to physicians and administrators. Indeed, such were the conditions of employment at that time that many graduates preferred to seek employment in the community as private nurses for wealthy or middle class families, or working in welfare agencies and associations providing services to the poor and needy. Still later, public health departments employed visiting and public health nurses, who, while nominally under bureaucratic control, providing skilled nursing services to clients in the community in what was often a fairly autonomous manner. Concern

over the status of nurses, however, led nursing leaders to realize that without further education, nursing would remain in an subservient and disadvantaged position with regard to both power and pay, and the first college-diploma program emerged before World War I.

All this has changed radically over the past several decades. For example, the number of hospital-based diploma programs dropped from 821 in 1964 to 460 in 1974 and to 129 in 1993, while associate degree programs grew from 174 in 1964 to 588 in 1974 and 857 in 1993. Meanwhile, university and college-based baccalaureate degree nursing programs expanded from 198 in 1964 to 310 in 1974, and to 507 by 1993. In addition, the number of Master's Degree Programs rose from 154 in 1983 to 252 in 1993 and Doctoral Degree Programs went from 31 to 54 in the same period.

This process of upgrading the formal training requirements for nursing is one of the most significant events in the process of increasing professionalization in nursing. The key event in this process was the position taken by the American Nurses Association's Committee on Education and adopted by the Board of Directors in September 1965, that "minimum preparation for beginning professional nursing practice-- ... should be the baccalaureate degree in nursing". Graduates of diploma and associate degree programs would be henceforth known as "technical" nurses.

The decision of the ANA to mandate the baccalaureate degree as the basis of professional nursing has split nursing ever since. The vast majority of nurses, trained at the

Diploma or Associate Degree level feel abandoned by a newly-powered nursing elite, which has consciously promoted higher standards of education in an effort to achieve professional recognition. This decision also has provided both the preconditions and impetus for development of new administrative, teaching, research and clinical roles for nurses, the last including nurse practitioners and advanced nurse specialists, who now are achieving acceptance as full partners in the provision of health care.

The American Nurses Association (ANA 1980) suggests that "the authority for nursing is based on a social contract between society and the profession" and that the "legal authority for nursing (nurse practice acts) stems from this societal contract, rather than the other way around." One of the major outgrowths of this effort has been the identification and articulation of an ethic of "caring" as a particular attribute of nursing and claims for a theory and science of nursing, partly developed by nurses, and partly derived from other disciplines. Rogers states that its central concern is with unitary human beings and their environments, the goal being the promotion of health. Thus far, critique of nursing theory rests on two points. First, that it is still developing and as yet does not possess sufficient depth and cohesion, and, second, that the diversity of agendas and views within nursing make it exceptionally vulnerable to divisions within and attacks from without.

Medicine

Medicine has had a long and distinguished tradition as one of the "learned professions". This was not always the case. Most early physicians were either itinerant travelers - one explanation for the staff of Aesculapius - or slaves and freedmen from countries with long traditions of medicine, who served in the households of wealthy persons. The early Greek medical schools and communities attempted to establish a science of medical diagnosis and treatment, although this consisted of little more than codified clinical observations and metaphysical speculations. Throughout the Middle Ages and into the Renaissance, physicians were often household servants or, at best, proteges of the royal courts and wealthy patrons. In the last century and even into the early days of this century, physicians in this country were impecunious and generally not held in high regard. It was not until medicine's alliance with science and the discovery of successful infectious and metabolic agents that its ability to produce effective results led to a rise in its prestige and power. With the approval and support of corporate interests, organized medicine was quick to build up and consolidate its independence and autonomy.

It may be interesting to look at the professions of medicine and nursing in terms of a linear model that describes the progress of an individual, a group, or a profession, or even a nation, in terms of stages of evolution and growth from dependence to independence to interdependence. Looked at in this way, it can be seen that following an early period of dependency, medicine has come to be regarded as largely independent, with concomitant autonomy and privileges granted by society and legally protected by the state in the form of laws defining the practice of healing. What medicine has failed to do, of course, (or even

seen the need to) is to progress beyond this stage of independence, other than to admit that it needs and utilizes the services and assistance of many other personnel in this health field.

More recently arrived, nursing was early placed in a subservient, dependent role which was reinforced by hospital rules and traditions, as well as by statutes, which required them to serve under the supervision or direction of physicians who were legally vested with the responsibilities and liabilities of such roles. What has been happening in the last several decades can be seen as a push on the part of nursing toward recognition of an independent status, free of the control and direct supervision of medicine and fully demanding of its rights and privileges as a full and independent profession. The recognition of independent roles and functions for nurse practitioners and other recipients of advance training speaks to the achievement of some degree of independence for some members of the nursing profession in some settings. Thus far, however, it can be stated that except a few areas, such as the community health centers, where the interdisciplinary health team has been encouraged, there has been little progress towards the further stage of interdependence, a stage which now characterizes the world at large in many other areas, including business and industry. The continued failure of the health professions to recognize and achieve such a working relationship constitutes their Achilles Heel. To the extent that they remain preoccupied with the need for autonomy and their individual roles and rights, it is clear that the powerful, now largely interdependent, forces of government and business will exploit the professions and reduce them to the level of technicians, albeit expert, where both their autonomy and the content of their work can be controlled and exploited. These were the tactics of industry and

management during the rise of corporate business in the last century and served successfully to render workers abused and impotent until the latter formed labor unions, which only belatedly were able to protect and advance the basic rights of workers.

Conclusion

In closing, it may be useful to describe two scenarios from the daily life and relationship of physicians and nurses, in the hope that they may serve to further elucidate the problem and suggest possibilities of needed changes. The first occurs at 7 am on the wards of a busy hospital and involves a tired, busy, but concerned nurse communicating the important features of the patient's night to a busy, and concerned physician. Their exchange is brief, vital, communicative, and essential to the care of the patient. Generally there is no posturing and no games-playing - a simple exchange of information, together with generation of a plan for treatment guided by their mutual concern and respect for the patient and their professional expectations of themselves and each other. The air is one of comfortable informality and open exchange. Each one has something of value and concern to the other, and within the constraints of the hour and setting, it is shared in a mutually supportive manner. Each is necessary to the other in the performance of their work and their roles and skills are mutually understood, accepted, and respected - at times even blurred. In short, their's is a relationship - at least for the moment - of interdependence and mutual trust.

The moment passes, and another scene emerges. It is now 11 am and the physician in the person of the Chief of Medical Staff meets with the Director of Nursing in the Hospital Administrator's office. After relatively cordial, if brief, greetings, the two take their seats on opposite sides of the conference table, marking their space with cups of coffee and thick file folders of previous meetings in what shortly begins to resemble a tense game of poker in Las Vegas, or the process of peace negotiation in Geneva. The air is one of guarded thought and formality with lots of talk, but little communication. It is like a scene at the bargaining table, with implicit and explicit rules of conduct, characterized by reluctant concessions and formal agreements, complete with safeguards and standards of performance, with much attention to accountability. For this moment, with unfortunate implications for earlier and later encounters, their's is an adversarial relationship, characterized by strong convictions of autonomy and independence. In short, they act like individual contractors attempting to cut the most favorable deal. The focus is no longer on the patient, or even on patient care, but on jockeying for position and power in the organization in and the conduct of their work, in a setting and with goals now established by the business of health care. The picture flashes to mind of two dogs, fighting over a piece of meat on the railroad tracks while an express train thunders down upon them.

These two scenes, so oft enacted in our hospitals and clinics appear to symbolize the problems of the health professions in the current climate and arena of health care reform. First, there is the loss or absence of the essential goal of the professions - the care of the patient without regard to time or cost. In its place is the concept of serving the "customer" -

in the shortest time and at the lowest cost possible. Second, having abandoned or sold their unique and respective birthrights as fiduciary agents for the patient, the professions spend their time bickering with each other over the worldly rewards of money and position, while allowing themselves to be potentially relegated to technical levels of skill and judgement by an unsympathetic and ununderstanding world of management and business. In short, descending to the level of competition with each other guarantees, not independence from, but dependence upon the rationed handouts of employers, thus insuring that the professional ideal of interdependence can never happen except under the rules and conditions of an indifferent, profit-motivated system.

Having set these two scenes, what are the important distinctions to be drawn from them? The first and perhaps foremost consists of the goals being served. In the former scene, both nurse and physician are focussed primarily on the best interests of the patient. In the latter, two dynamics are going on. One, both of the participants represent the "elites" of their professions and, two, each has another loyalty or constituency to serve, which obscures, if not negates, their common goal. The second distinction consists of the roles being played. In the former, despite the status dispositions of the past, both are equally important in the care of the patient. Failure of one or the other to carry out their functions will surely limit the outcome as far as the patient is concerned. In the latter, as representatives of organized groups, they sit as negotiating parties to a contract, the terms of which are how being largely dictated by powerful forces representing outside interests. Third, at the bedside, the nature of the transaction - patient care - is defined and protected by law and by a set of fiduciary

expectations and promises embedded within a framework of social values and contracts. At the conference table, there is a complicated process of negotiation generally conducted in an atmosphere of suspicion and grudging compromise. Fourth, around the patient, there is a sense of common ground - each person moving freely and comfortably, with a sense of shared belonging and ownership. At the negotiating table, the ground is neutral at best - with neither the nurse or physician being at home or in charge - and as a result, both feeling the need to establish or defend territory and to be hyperalert to any real or perceived displays of power or encroachment.

Also at work in these scenarios are two factors that cannot be ignored. One consists of the age-old issues of gender, territoriality and power which have been discussed above. The other is so new and so powerful that as yet neither nursing or medicine has fully understood, much less accepted it. It consists of the growing power and influence of government and business over the place and work of the two professions - a movement that promises to reduce them both to the level of technicians. If these outside forces have their way, the classical theory and position of the professions will be replaced by an unrelenting march toward a marketplace or bureaucratic model, in which the traditional fiduciary concerns of the helping professions will be further denigrated, and cost and profit will be the rule and ruler.

It may be helpful to explore several other scenarios. The next one takes place in the hospital's brightly lighted, operating suite. The patient is being draped by the surgical nurse,

while in the background the surgeon is being gowned and gloved for the forthcoming procedure. He walks to the operating table, asks the surgical nurse to check the instruments once more and tells the nurse anesthetist to proceed with putting the patient under. The scene is one of efficiency and clear authority. Communications are business-like, generally one way, and the surgeon is clearly in charge. The gender and power differences are marked.

Yet another scene - the private office of a solo physician. Here doctor and nurse have worked together for years in a well-ordered, traditional manner, the latter preparing patients for the doctor's visit and following-up with his or her instructions. Again, the doctor appears to be in charge, although it is the nurse who really "runs" the practice.

The scene shifts once again to the inner city, where a publicly-funded community health center sees patients from the local area, many of whom do not speak English. A Spanish-speaking health aide or receptionist looks up at a line of waiting patients and after a few questions efficiently sends some to their scheduled appointments with any of several kinds of health personnel, or to see the triage nurse, who in turn may dispatch them to a nurse-midwife for a prenatal check, or to the nurse practitioner for an interview and examination, leading perhaps to a prescription for medication clearly defined within an established formulary. Down the hall, the physician also is seeing patients, some on referral directly from the triage nurse, some from the nurse practitioner, but more likely simply another patient from the same pool.

Another scene, this one in the far reaches of a Western state where a once-thriving mining town hangs on with its remaining inhabitants. The nearest hospital is some 90 miles away where two primary care physicians maintain separate solo practices near a small Hill-Burton hospital: one an older DO and the other an young family physician, who works with a physician's assistant. A rehabilitation counselor and a nurse with advance training in mental health, as well as in alcohol and substance abuse round out the available health resources. In the smaller, distant community the only health services available are from a nurse practitioner or physician's assistant who works out of the family physician's office in the larger town and may live there, commuting to the smaller community several days a week. Perhaps, once a week, under ideal circumstances, the physician from the larger town, may visit to countersign charts or consult on puzzling cases, but, in general, communication is carried on by telephone, and referrals are made to the hospital only for problems beyond the immediate skills and comfort of the nurse practitioner or physician's assistant.

The final scenario takes place in a modern, multilevel, managed care organization, or HMO, where staffing has been carefully calculated on a formula (read profit-making) basis to provide the a maximum of services at a minimum cost. Correctly perceiving that the majority of patient visits are manageable at less than the highest levels of expertise, the organization has worked out staffing patterns which feature primary care "gatekeepers", often in the form of nurse practitioners, together with other service personnel, including primary care physicians, physician's assistants, and nurse clinicians. Referrals are tightly controlled, with expertise graduated by level of need. In this scenario, both physician and nurse can be

viewed as employees, providing necessary technical services within a system oriented to and run by business or commercial interests with an eye to the bottom line and to profit margins. Protocols are defined and limited, discretion is constricted, and personnel (read workers) are bureaucratically held to these with relatively serious consequences for major departures. There is relatively little rivalry between the professionals since there is obviously neither turf nor power to be disputed, both of the latter being controlled by the managers and the business interests. Both nurses and physicians are left with defending the relatively few degrees of freedom or privilege accorded them within a strictly structured system and the satisfactions and rewards of patient care become secondary to performance of work. The industrial model has come of age in the health professions.

What has been the purpose of this exercise? In the main, it has been to point out that the relationship between physicians and nurses, as well as that between these professions and their collegial constituents varies along a number of dimensions. The immediate one appears to be that of setting which, in turn, is determined by available resources, both personnel and facilities, as well as by levels of education and expertise. Looking at it from one point of view, the greatest resources - most highly trained and costly - are going to be made available where there are the greatest economic rewards, i.e. the surgical operating room. Next in line probably comes the hospital, then the HMO, followed by the private office, the community health center and, finally, the rural hospital, with its satellite care facility. What is clear is that the relationship between physician and nurse and their constituent bodies, physician assistants and nurse practitioners, varies greatly in all these settings, from one of

clear authority in the hands of the surgeon at one end to wide-ranging discretionary activity and authority in the hands of the nurse practitioner or physician's assistant in the remote setting. Rather than put these into the classic sociologic terms of subordination or superordination of authority and power, it seems useful in today's world to order these relationships along the paradigm suggested earlier - along a scale of dependence, independence and interdependence.

It is the author's perception that, starting from earlier relationships featured by dependence or subordination, nursing has advanced to the status of independence where it now is demanding its rightful place along side medicine and the other health professions, while true interdependence remains yet to be realized, at least at the organizational level. In a sense, this is strange, because, despite the legacy of dependence that might have existed traditionally, the relationship of medicine and nursing around the patient has long been one more of interdependence than dependence. Furthermore, despite the drive for independence of action and practice being seen from the nursing profession, it may be that it would be more advantageous for the competing health professions, to look beyond the current paradigms of power and territorial possession towards a new paradigm of interdependence, more in line with the global village.

Perhaps another way in which these issues can be discussed and understood in new and different ways is suggested by the long sociological interest in the "sacred". This does not represent religion or religious behavior or organization, but rather a larger sense of

shared values that are at the heart of the human condition. The sense of the sacred forms a connection, the glue as it were, between human beings with their individual concerns and yearnings and a sense of common purpose and values. It underlies and forms the basis for marriage, the family, the group, the community, the culture and, yes, the profession. In this sense, it takes on a moral purpose and provides a backdrop of moral values to the common endeavors of life. It stands over and against what Durkheim called the "profane" - or secular - those reductionist forces and structures in life which rationalize, individualize, mechanize and materialize human behavior and actions, denying that moral values and purpose have a place - the central place - in human existence. Without this sense of the sacred or "calling" as Weber called it, the original concept of profession as "a community of equals", with a deep dedication to service, and self-criticism and its subsequent claim to moral authority would not - could not - have existed. Perhaps it is in this framework that the health professions can resolve their differences and seek a new consensus of purpose and performance in the service of society - as interdependent partners in the health endeavor.

Most parties enter a negotiating process with a win-lose attitude. Their hope is for some solution involving the least loss of prerogatives and perceived power. While the stated goal often is consensus, this process generally can be viewed as a politically achieved consensus, at best involving compromise - a bargaining down to the lowest common denominator or least objectionable level- with each side having to give up something of perceived value which often becomes the nidus of future resentment and sabotage. The Quaker view of consensus is something quite different -and much more. Calling for a

process of spiritual "leading", the aim and effort is to rise above or transcend the adversarial perceptions and pre-conditions with which the parties usually enter the transaction and to seek to find a new, higher level of understanding and acceptance of the problem and of the concerns and needs of each party. Organizational and institutional agendas are consciously set aside while the individuals, as individuals, allow themselves to become totally involved in and committed to the search for a better understanding, and hopefully, a new vision. Given the common moral and spiritual heritage of both professions, such a process seems both possible and called for.

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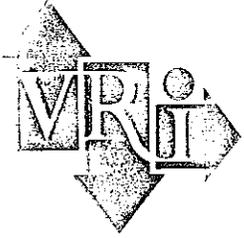
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Appendix B:

**Report from Vector Research, Inc.:
Development of Integrated Requirements for
PAs, NPs, CNMs, and Physicians (MDs and DOs)**



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20 September 1995

DEVELOPMENT OF INTEGRATED REQUIREMENTS
FOR PAs, NPs, CNMs, AND PHYSICIANS (MDs AND DOs)

Final Report

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FOREWORD

This report is a comprehensive documentation of the technical work performed to develop the primary care Integrated Requirements Model (IRM). The work was performed for the Health Resources and Services Administration, under contract number 240-94-0033, by Vector Research, Incorporated (VRI) and its subcontractors Research Triangle Institute (RTI) and Lewin-VHI, Incorporated.

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EXECUTIVE SUMMARY

The primary care Integrated Requirements Model (IRM) was developed to forecast US requirements for physicians, physician assistants (PAs), nurse practitioners (NPs), and certified nurse-midwives (CNMs) for delivery of primary health care services. The model is pre-loaded to provide estimates of practitioner requirements under six scenarios, each associated with assumptions about insurance coverage, managed care penetration, and use of non-physician providers. The user-friendly personal computer implementation of the IRM is designed so that the user can also forecast requirements under an unlimited number of scenarios by varying model inputs and parameters. The IRM was developed under contract to the Bureau of Health Professions (BHP) of the Health Resources and Services Administration by Vector Research, Incorporated and its subcontractors Lewin-VHI, Incorporated and Research Triangle Institute.

Background of the IRM

In early 1994, several health care reform initiatives were being considered to expand the methods of delivering cost-effective, quality primary care through the use of a skill mix of physicians, PAs, NPs, and CNMs. The Clinton Administration's Health Security Act called for specific measures to be taken in order to focus federal support for the education of these practitioners and to eliminate existing barriers to practice. As a result, a Joint Primary Care Workforce Working Group consisting of members from the Council on Graduate Medical Education (COGME) and the National Advisory Council on Nursing Education and Practice (NACNEP) was created. Its mandate was to examine the requirements for primary care practitioners, integrating the contributions of physicians, PAs, NPs, and CNMs in providing for all of the primary care service needs of the US population. Existing BHP workforce requirements models were specific to either

physicians or nurses and did not focus on primary care; therefore, this project and its products were commissioned to support the deliberations of the joint working group.

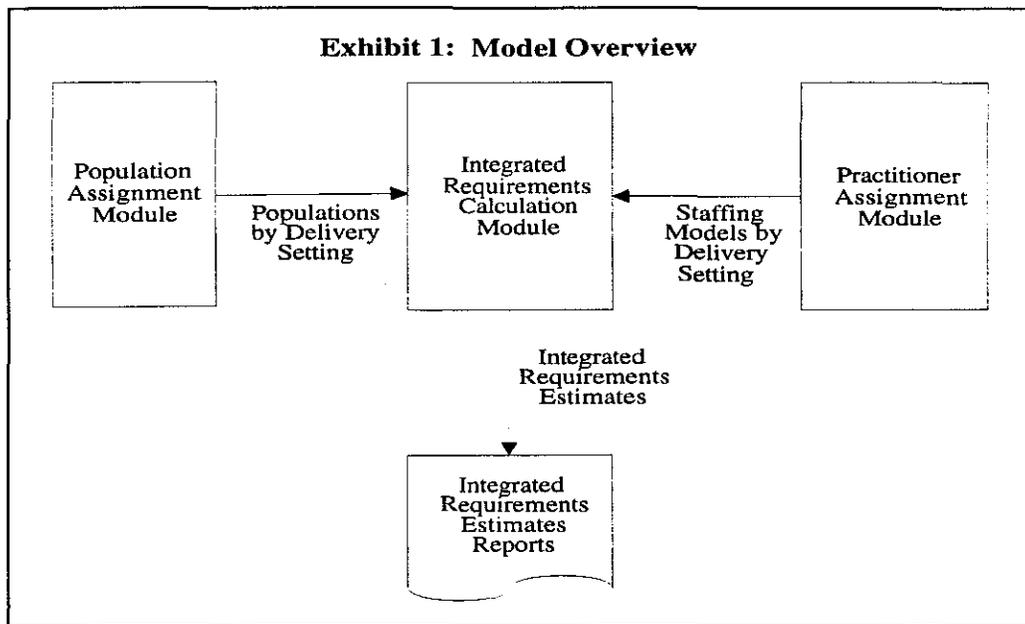
Results of Literature Search

The first step in the development of the model was to review the relevant research and data. Searches were conducted for information in the following three areas: (1) primary care services delivery options; (2) primary care services demand; and (3) government and private sector health care reform. Major findings include the following:

- Recent research covering use of PAs, NPs, and CNMs is sparse. Most of the research into the use of these practitioners was conducted in the 1970s.
- The quality of care provided by PAs, NPs, and CNMs, within their area of expertise, is at least as good as that provided by physicians. Furthermore, PAs and NPs can perform a large proportion of primary care services, perhaps as much as 80% or 90%.
- While evidence tends to support the view that PAs, NPs, and CNMs are cost effective, there is uncertainty about the results due to the complexity of the issue and the age of the relevant data.
- Data on HMO staffing, when not rendered useless by definitional problems or data gaps, shows wide variations in staffing patterns. It is not possible to draw conclusions from these data on where best practices may be headed.
- There is no consensus in the literature on the definition of primary care.
- There are overlaps in the activities of generalists and some types of specialists, particularly in primary care.
- Given the current structure of the US health care system, it is difficult to observe true need for primary care.
- Three major influences of potential health care reform were identified: market trends, government intervention, and alternative staffing models.

IRM Model Structure and Methodology

Conceptually, the IRM uses a capitated approach, forecasting requirements for full-time-equivalent (FTE) primary care practitioners per 100,000 people. Primary care practitioners are defined as family practice, general internal medicine, general pediatrics, and obstetrics/gynecology physicians; primary care PAs; NPs; and CNMs. The model is divided into three distinct modules: a population assignment module; a practitioner assignment module; and an integrated requirements calculation module. The following exhibit illustrates this concept.



The essence of the capitated methodology is to assign populations to specific health care delivery settings and then to choose a staffing configuration for each setting. Health care delivery settings are defined according to age, location, and insurance status. The population assignment module distributes the US population across the detailed delivery settings listed in exhibit 2.

Exhibit 2: Insurance Distribution Data Characteristics

Description	Categories	Category Count
Sex	Male, Female	2
Age	0-4, 5-17, 18-44, 45-64, 65-74, 75-84, 85+	7
Location	Urban, Rural	2
Insurance Type	Staff HMO, IPA HMO, FFS, Medicaid Staff HMO, Medicaid IPA HMO, Medicaid FFS, Medicare Staff HMO, Medicare IPA HMO, Medicare FFS, No Insurance	10

The practitioner assignment module assigns practitioner staffing models to the aggregated health care delivery settings listed in exhibit 3.

Exhibit 3: Aggregated Health Care Delivery Settings

Urban	Rural
Staff HMO	Staff HMO
IPA HMO	IPA HMO
Fee-for-Service	Fee-for-Service
No Insurance	No Insurance

Both of these modules feed their resultant data into the integrated requirements calculation module, which assigns compensation levels to each practitioner type and then

makes the necessary calculations to produce the forecasts of integrated practitioner requirements. The model also produces reports summarizing the population by insurance setting and the practitioner staffing models associated with the scenario being run.

IRM Scenario Definitions

The IRM produces annual forecasts for the years 1995 through 2020. All scenarios incorporate US Bureau of Census projections of the US population by age and sex. The distribution of the population by setting (urban/rural and insurance status) and the staffing patterns associated with each aggregated setting were estimated by the project team for 1995, and modified in future years to varying degrees in each of the IRM scenarios.

The six scenarios that are provided with the model are defined below.

- (1) **Status Quo.** The 1995 insurance distributions and staffing models are applied in all projection years to measure the effects of changing US population demographics, all else held constant.
- (2) **Baseline Insurance Projection.** In addition to shifts in population demographics, expected shifts in insurance coverage are incorporated, making this scenario the “best estimate” baseline forecast.
- (3) **High Managed Care.** Populations are shifted into HMO settings to a greater degree than in the baseline insurance projection scenario. This scenario is modeled for the year 2005.
- (4) **Universal Coverage.** Building upon the high managed care scenario, the uninsured population is then shifted into other insurance settings, particularly HMOs. This scenario also assumes increases in preventive care in fee-for-service, thus increasing fee-for-service staffing levels. This scenario is modeled for the year 2005.

- (5) **Equal Access Under Universal Care.** Building upon the universal coverage scenario, staffing models are increased as required to provide parity for underserved populations in access to primary care. This scenario is modeled for the year 2005.
- (6) **High PA, NP, CNM.** Insurance settings are forecast the same as for the baseline insurance projection scenario. Staffing patterns are shifted by doubling the use of PAs, NPs, and CNMs, assuming a substitution factor of 0.5 (i.e., non-physician providers trade off for physicians at a rate of .5 physicians per 1 non-physician provider). This scenario is modeled for the year 2005.

Conclusions

It is widely agreed that the spread of managed care and competitive pressures in the health care arena are altering health care workforce requirements. The research conducted in the development of the IRM, and the six scenarios to which it has been applied in this report, shed light on how requirements for primary care practitioners are being affected.

Exhibit 4 displays aggregate staffing ratios for each of the eight delivery settings, standardized to the total 1995 population. One of the key features of the IRM staffing models is that they adjust automatically to changes in the age/sex composition of the population. Thus, to make fair comparisons, they must be applied to a standard population. The 1995 national population was chosen for this purpose. Ratios in this exhibit represent practitioners per 100,000 population implied by the staffing models, assuming they are applied to the total US population as of 1995.

Exhibit 4: 1995 Staffing Ratios Standardized to US Population

	Practitioners Per 100,000			
Urban	PCPs	PAs	NPs	CNMs
Staff HMO	82	5.5	12.0	1.9
IPA HMO	89	3.9	10.8	1.4
Fee-for-Service	84	3.4	9.5	1.7
Uninsured	45	1.9	9.0	.8
Rural				
Staff HMO	54	12.9	7.8	2.0
IPA HMO	64	9.3	8.2	2.0
Fee-for-Service	59	8.4	6.9	2.1
Uninsured	31	4.7	6.3	.8
Total US	76	4.5	9.6	1.6

Examination of these standardized staffing models suggests that:

- primary care staffing ratios are not affected nearly as much by managed care as they are by distinctions between insured and uninsured and between urban and rural populations;
- NPs and PAs are used somewhat more intensively under managed care;
- with the exception of NPs, staffing ratios are much smaller for uninsured populations; and
- PAs treat a disproportionate share of rural populations.

Based upon these observations, the spread of managed care alone can be expected to have relatively small effects on primary care practitioner requirements, except possibly for

PAs and NPs. On the other hand, changes in the size of the uninsured population could significantly impact requirements for all practitioners except NPs. These deductions are supported by the scenario results described below.

Exhibit 5 summarizes findings from the scenario analyses. It shows the increase in practitioner requirements for the year 2005, relative to 1995 levels, under each of the six scenarios. It is interesting to compare these percentage increases to the 9.4% increase in the US population over the same period.

Exhibit 5: Percent Increase in Requirements Relative to 1995

	Status Quo	Baseline Insurance Projection	High Managed Care	Universal Coverage	Equal Access Under Universal Coverage	High NP, PA, CNM Use
PCPs	10.4%	11.5%	12.1%	20.3%	22.7%	-2.6%
PAs	11.4%	15.1%	20.6%	30.7%	33.3%	130.0%
NPs	12.3%	15.4%	19.2%	21.2%	23.6%	130.4%
CNMs	1.8%	-0.3%	-1.4%	9.5%	11.7%	99.3%

The results of the status quo scenario show that, in the absence of changes in insurance distributions and staffing models, the requirements for primary care physicians (PCPs), PAs, and NPs do just a bit better than keep pace with population growth. CNMs lag way behind, because of the lack of growth in the female population of child bearing ages.

The baseline insurance projection scenario and high managed care scenarios represent varying degrees of increase in HMO penetration, with emphasis on IPA model HMO growth. Given current staffing model estimates, the spread of managed care has little impact on PCP or CNM requirements, but does result in a significant increase in PA and NP requirements. For example, in the high managed care scenario, PCP requirements

grow by about 12% from 1995, whereas they grew by over 10% with no growth in managed care. On the other hand, PA requirements grow by over 20% under high managed care and by less than 12% with no managed care growth.

Under universal coverage, requirements for all practitioners except NPs are increased significantly. This was predicted from examination of the staffing models which show that all but NP staffing ratios are significantly less for uninsured populations. Although not shown in the exhibit, the detailed scenario results show that covering the uninsured results in an increase of about 7% in PCPs, 8% in PAs, 2% in NPs, and 11% in CNMs. Augmenting universal coverage with a program to equalize access to care for otherwise underserved populations results in an estimated increase in practitioner requirements of 2% above the straight universal coverage scenario.

The final scenario shows that a hypothetical increase in the productivity ratio of non-physicians from .40 to .50, combined with a doubling in the use of non-physicians, reduces physician requirements back to slightly under 1995 levels. Of course, this conclusion hinges upon the assumption of a .50 productivity ratio. The reduction in physician requirements would be even greater if the ratio were greater.

These scenario results suggest that the spread of managed care does not dramatically alter primary care practitioner requirements unless there are other forces causing changes in current staffing models. Compelling empirical evidence as to where staffing models might be headed was not found. Data on HMO staffing, when not rendered useless by definitional problems or data gaps, tends to show wide variations in staffing patterns. It is simply not possible to draw any conclusions on where best practices may be headed.

Reviews of the literature suggest that while it is feasible to organize a practice such that non-physicians are nearly as productive as physicians (a substitution ratio near 1.0), this is not the norm. Instead, non-physicians generally tend to spend more time with their patients and, as a result, cannot care for as large a patient population as a physician can. While there is undoubtedly a wide variation in substitution ratios found in current practice, a value of .40 seems to be in the middle of the range of estimates.

This .40 ratio could simply reflect the fact that PAs and NPs cost about 40% of what a primary care physician costs and, thus, they can be about 40% as productive (i.e., spend a little more than twice as much time with their patients) and still be cost effective. It seems

possible that aggressive, bottom-line oriented HMOs will ultimately push for greater productivity in their non-physicians and drive the substitution ratio upward. However, no empirical evidence of trends in this direction was found. The high PA/NP/CNM use scenario, therefore, is hypothetical rather than a firm prediction of where the market is heading at this time.

Recommendations

While there are no obvious trends in currently available data on HMO staffing models, there is a high level of interest and research in this area. Results should be carefully monitored and, as trends become clearer, they should be incorporated into the model. The model has been designed to make this easy to accomplish by the average user.

A key result of the scenarios analyzed is the rather mild impact of managed care on primary care practitioner requirements. This is not necessarily an obvious result, but is not counter-intuitive either. Managed care includes incentives for efficiency that push in the direction of reducing workforce to population ratios. However, in the case of primary care practitioners, this downward pressure is potentially offset by the cost advantages of shifting care to primary care practitioners from specialists. To the extent that these two forces are offsetting, managed care will have small effects on primary care practitioner ratios.

In the case of specialists, the forces are not offsetting — both push in the direction of reducing the use of specialists. To gain a full picture of workforce trends, it would be most useful to include specialists in the integrated requirements analysis.

1.0 INTRODUCTION

The main objective of this project was to develop a model to forecast national integrated requirements for physicians, physician assistants (PAs), nurse practitioners (NPs), and certified nurse-midwives (CNMs) for delivery of primary health care services. Both government and market-driven health care reforms are exploring expanding current approaches to the delivery of cost-effective, quality primary care through the use of a mix of physicians and other primary care practitioners. While the Bureau of Health Professions (BHP) has developed and applied discipline-specific models of both physician requirements and nurse demand, no integrated model of practitioner requirements existed. The Bureau contracted with VRI and subcontractors RTI and Lewin-VHI to study, model, and forecast integrated primary care provider requirements under a number of alternate scenarios.

The primary care Integrated Requirements Model (IRM) forecasts were required to be specific to urban and rural areas and several health care settings. Model results were required to be generated under a baseline "best estimate" scenario and under several alternate sets of assumptions. Finally, the model was required to be automated as a user-friendly tool for use on a personal computer.

The technical expertise of the project team on this effort was supplemented by expert input gathered in at least two ways. First, an extensive literature search was conducted on data and research into primary care staffing patterns, including quality and cost issues, factors affecting the demand for primary care, and aspects of health care reform. Second, expert input was provided at key stages of the project by members of the Joint Council on Graduate Medical Education (COGME)/National Advisory Council on Nursing Education and Practice (NACNEP) Primary Care Workforce Working Group.

This final report on the development of the IRM is divided into five chapters. Chapter 2 describes the modeling approach, summarizes results of the literature search, and defines the final model structure. Chapter 3 documents the data sources and methodologies applied in the estimation of baseline model inputs and parameters. Chapter 4 defines several alternate scenarios that are provided with the model and describes the resulting IRM forecasts of provider requirements under each scenario. Finally, chapter 5 presents overall

conclusions and recommendations. The complete results of the literature search on primary care staffing options, primary care demand, and health care reform initiatives is included as appendix A.

2.0 MODELING APPROACH AND METHODOLOGY

This chapter describes the overall approach to developing the primary care Integrated Requirements Model (IRM) and the final model structure. The first step in model development was a review of relevant research. The results of this literature search are summarized in section 2.1 below and are provided in full detail in appendix A. Information from the literature search and input from the Joint COGME/NACNEP Primary Care Workforce Working Group contributed to the final model design, which is described in section 2.2.

2.1 LITERATURE SEARCHES

This section presents the highlights of the literature search and the implications for the IRM modeling effort. Searches were conducted for information on three areas of relevance to this modeling effort: (1) primary care services delivery options; (2) primary care services demand; and (3) government and private sector health care reform. Results of the literature search in each area are discussed in a subsection below.

2.1.1 Summary of Research on Primary Care Delivery Options

Topics of interest in examining research on the delivery of primary care services included:

- staffing configurations for delivery of primary care;
- productivity of each type of primary care practitioner, including any variations according to working environment; and
- cost-effectiveness of staffing models or practitioner types.

Computer searches were conducted on major literature databases including Medline, Health Planning and Administration, Educational Resources Information Center, Dissertation Abstracts, Federal Research in Progress, the National Technical Information Service (NTIS) and Sociological Abstracts. Phone calls were also placed to key

individuals to supplement the literature search. In all, over 400 references were requested and reviewed by the project team. Major findings are summarized below.

- Most research into the use of NPs and PAs was conducted in the 1970s, when these types of practitioners were relatively new. Educational preparation of NPs and PAs has expanded since then, likely strengthening positive conclusions on quality of care and scope of services potentially offered by NPs and PAs.
- Research into CNMs did not receive the same focus as the “new providers” in the 1970s, and most of the CNM studies have focused on quality of care issues.
- The literature overwhelmingly indicates that the quality of care provided by NPs, PAs, and CNMs, within their areas of expertise, is at least as good as that provided by physicians.
- Legal and behavioral barriers to full use of non-physician providers, including supervision requirements, prescriptive authority, and scope of practice, vary widely across the states; states with favorable practice environments have been strongly associated with a larger supply of non-physician providers;
- The literature indicates that PAs and NPs can perform a large proportion of primary care services, perhaps as much as 80% or 90%. Primary care physicians are better able to manage complex cases, whereas NPs excel in providing preventive care, counseling, patient education, and care for chronically ill patients. PAs can perform many of the same functions as physicians, including preventive services, counseling, and patient education.
- A figure often quoted as a minimum physician staffing level is four physicians in an area to support call coverage over a sustained period of time; rural practices tend to have on-call groups of fewer than four physicians.
- While there is a sparsity of studies on the proportion of services CNMs can perform, evidence provided by individual HMOs indicates that much greater use of CNMs could be made in low-risk delivery and other areas (for example, one HMO had as high as 70% of low-risk births managed by CNMs for an HMO, versus the 5% national average).
- In general, staffing data available from HMOs or managed care organizations did not prove useful in developing per capita primary care staffing ratios for use in the model. Critical pieces of information were not obtainable, such as demographic data on the population served, or full-time-equivalent measures of physicians rather than simply counts of physicians participating with the HMO.

- Factors affecting productivity of primary care practitioners include: group size (groups were found to be more productive than individuals, with small groups more productive than larger groups), income incentives (fee-for-service more productive than salaried), and physician delegatory style (the more delegation, particularly of compatible tasks, the more efficient the NP).
- While studies have supported the cost effectiveness of non-physician practitioners, there is uncertainty about the results because of the complexity of the issue, difficulties in measuring productivity, and the fact that data sources used generally date back to the 1970s and early 1980s.

2.1.2 Summary of Research on Primary Care Demand

Preliminary designs of the IRM included separate modules for forecasting primary care services demand and for forecasting the productivity of providers to meet that demand. Explicitly modeling demand for services and provider productivity introduces a variety of complex data and measurement issues. The examination of existing data and research into primary care demand was instrumental in the evolution of the final IRM design to a capitated approach.

Topics covered under this literature search included definitions of primary care, factors affecting the demand for primary care, and measures of the need for primary care.

Highlights are provided below.

- There is no consensus in the literature on the definition of primary care. Approaches include defining primary care based on **a set of activities** or competencies associated with the provider, **a process** matching the needs of the individual with health services over time, **a level of care** that is first contact in nature, **a strategy** for organizing a health care system, and **a philosophy** characterized by social justice, and a sharing of decision making power.
- Research has shown overlaps in the activities of generalists and some types of specialists, particularly in activities one would likely define as primary care in nature. The existence of these overlaps complicates the definition of primary care as care provided by a particular set of practitioners.
- The demand for primary care can be described as resulting from a combination of factors related to the health care delivery system (including affordability and availability) and socioeconomic/demographic factors.

- Primary care demand factors related to the health care delivery system include:
 - insurance coverage;
 - cost sharing;
 - provider-induced demand;
 - gatekeepers;
 - utilization review; and
 - emphasis on preventive care.
- Based on the above factors and empirical findings from the literature, six insurance settings were considered dissimilar enough to warrant separate attention in the model:
 - fee-for-service insurance plans;
 - staff managed care organizations;
 - Independent Practice Associations (IPAs), Preferred Provider Organizations (PPOs), and Point-of-Service managed care organizations;
 - Medicare;
 - Medicaid; and
 - uninsured.
- The major socioeconomic and demographic characteristics found in the literature to impact demand for health care were age, sex (with differences due primarily to obstetrical/gynecological reasons during female child-bearing years), income, geographic location, and race.
- Given the current structure of the US health care system, it is difficult to observe true need for primary care. The literature search identified instead guidelines and other standards for preventive care as measures of need. The DHHS “Healthy People 2000” guidelines, as well as a report by the US Preventive Services Task Force could provide a basis for estimating a measure of need for primary care services that goes beyond currently observed demand.

2.1.3 Summary of Information on Health Care Reform

Information on public and private health care reform activities was gathered to support development of relevant “what-if” scenarios under which IRM projections could be generated and compared. Three basic elements of potential health care reform scenarios were identified: (1) market trends; (2) government intervention; and (3) alternative staffing models. The four major market trends identified were:

- (1) increased managed care penetration;
- (2) increasing cost-sharing requirements;

- (3) greater use of guidelines and outcomes measures; and
- (4) declining insurance coverage.

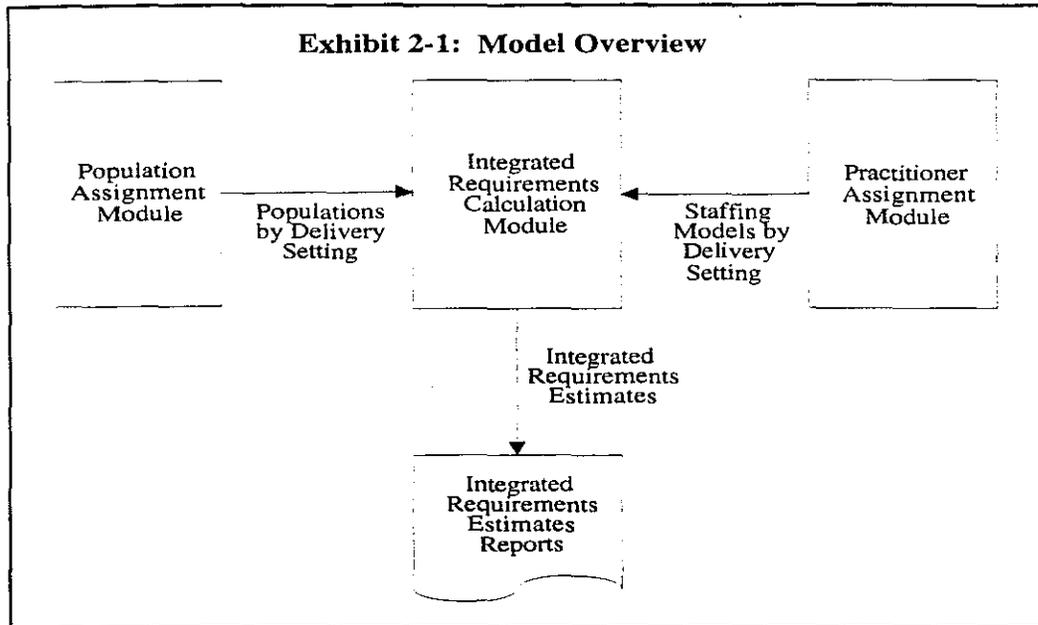
The five broad government interventions identified were:

- (1) universal coverage;
- (2) constraints on expenditures;
- (3) increased affordability of insurance;
- (4) insurance market reform; and
- (5) delivery system/regulatory changes.

2.2 MODEL STRUCTURE AND APPROACH

This section discusses the methodology that was used for developing the personal computer-based model that calculates the integrated requirements estimates for the four primary care practitioner groups (MDs and DOs, PAs, NPs, and CNMs) under various scenarios. It presents the design of the conceptual model that is used in generating integrated requirements estimates and also describes the types of scenarios that may be simulated by the model when various scenario attributes are manipulated by the user.

Conceptually, the integrated requirements model uses a capitated approach and can be divided into three distinct modules: a population assignment module, a practitioner assignment module, and an integrated requirements calculation module. Exhibit 2-1 illustrates this concept.



The essence of the capitated methodology is to assign populations to specific delivery settings and then to choose a staffing configuration for each setting. In this model, health care delivery settings are defined according to:

- age (under 65, 65 and older);
- location (urban, rural); and
- insurance status.

The resulting 20 delivery settings are presented in exhibit 2-2.

Exhibit 2-2: Health Care Delivery Settings Characteristics

	Rural	Non-Rural
Under 65	Staff HMO	Staff HMO
	IPA HMO	IPA HMO
	FFS	FFS
	Medicaid Staff HMO	Medicaid Staff HMO
	Medicaid IPA HMO	Medicaid IPA HMO
	Medicaid FFS	Medicaid FFS
	No Insurance	No Insurance
65 and Older	Medicare Staff HMO	Medicare Staff HMO
	Medicare IPA HMO	Medicare IPA HMO
	Medicare FFS	Medicare FFS

The population assignment module distributes the US population by age and sex across these health care delivery settings. The practitioner assignment module assigns practitioner staffing models to aggregations of these same health care delivery settings. Staffing models are defined as practitioners per 100,000 people for all four practitioners types. These practitioner staffing models are also defined in terms of the age/sex characteristics of the population served. Both of these modules feed their resultant data into the integrated requirements calculation module, which makes the necessary calculations and adjustments, and then produces integrated requirements estimates.

The following three subsections describe these modules in detail, focusing on the module inputs, processes, and outputs. Detailed discussions of the data sources and methodologies estimates module inputs and parameters are covered in chapter 3.

2.2.1 The Population Assignment Module

In keeping with the capitated approach to the model, the population assignment module is responsible for assigning disjoint subsets of the US population to the health care delivery settings defined earlier in exhibit 2-2. When the population assignments are combined by the integrated requirements calculation module with the practitioner staffing models provided by the practitioner assignment module, the integrated requirements estimates for all four practitioner groups are produced.

The population assignment module has two sets of inputs: population data and insurance distribution data. These two sets of inputs are described below.

Populations are input to the model according to the age, sex, and location categories shown in exhibit 2-3. This partially completes the assignment to delivery setting. To complete the assignment to delivery setting, these age/sex/location subsets are distributed across relevant insurance categories.

Description	Categories	Category Count
Sex	Male, Female	2
Age	0-4, 5-17, 18-44, 45-64, 65-74, 75-84, 85+	7
Location	Urban/Rural	2

Through the use of program controls, the user is able to control how population groups are assigned to insurance distributions for a given year, thereby producing a scenario's health care delivery settings. Specifically, the user is able to assign disjoint population groups to insurance distributions in two ways:

- by selecting from a menu of choices pre-loaded into the module; and
- by creating custom distributions using the module's editing capabilities.

The user is able to assign insurance distributions to four disjoint population groups, based on two age categories and two location categories. The age categories are under 65 and 65 or older, and the location categories are urban and rural. However, all model calculations are performed at a more detailed level as shown in exhibit 2-4.

Description	Categories	Category Count
Sex	Male, Female	2
Age	0-4, 5-17, 18-44, 45-64, 65-74, 75-84, 85+	7
Location	Urban, Rural	2
Insurance Type	Staff HMO, IPA HMO, FFS, Medicaid Staff HMO, Medicaid IPA HMO, Medicaid FFS, Medicare Staff HMO, Medicare IPA HMO, Medicare FFS, No Insurance	10

In order for the historical and projected populations to be matched to the staffing models described in subsection 2.2.2, they are aggregated by location into the following four categories:

- staff HMO;
- IPA HMO;
- fee-for-service (FFS); and
- no insurance.

This produces eight aggregated health care delivery settings, four each for urban and rural, as shown in exhibit 2-5. This aggregation is accomplished by adding all of the staff HMO populations together, the IPA HMO populations together, and finally, all of the fee-for-service populations together. Thus, the output of the population assignment module is a set of historical and projected populations for eight aggregated health care delivery settings. Within each delivery setting these population counts are tracked by age and sex.

Exhibit 2-5: Aggregated Health Care Delivery Settings

Urban	Rural
Staff HMO	Staff HMO
IPA HMO	IPA HMO
Fee-for-Service	Fee-for-Service
No Insurance	No Insurance

2.2.2 The Practitioner Assignment Module

This module guides the assignment of primary care practitioners to each of the following eight aggregated health care delivery settings depicted above in exhibit 2-5.

This is accomplished through the use of pre-defined staffing models that are stated in terms of practitioners per 100,000 population. For each health care delivery setting, the user selects a staffing model from the menu of possible choices. The same model may be chosen for multiple health care delivery settings or each health care delivery setting may have its own unique model.

The inputs to the practitioner assignment module consist of the set of pre-loaded staffing models. Using the module's editing capabilities, the user can create additional staffing models. The user then selects a staffing model for each of the eight aggregate

health care delivery settings. These selections are then output to the integrated requirements calculation module.

Staffing models are defined in terms of practitioners per 100,000 population for each of four practitioner types and 14 age/sex categories as shown in exhibit 2-6. This age/sex detail is a critical aspect of the model design since it enables the integrated requirements estimates to be automatically adjusted for the age/sex composition of the population to which a given staffing model is applied.

Exhibit 2-6: Staffing Model Input Matrix

Population Categories		Physicians per 100,000	NPs per 100,000	PAs per 100,000	CNMs per 100,000
Male	0-4				
	5-17				
	18-44				
	45-64				
	65-74				
	75-84				
	85+				
Female	0-4				
	5-17				
	18-44				
	45-64				
	65-74				
	75-84				
	85+				

For example, at present the populations enrolled in HMOs tend to be younger than fee-for-service populations. Thus, under a scenario in which fee-for-service populations (especially Medicare populations) are shifted into HMOs, it is crucial that the overall HMO

staffing ratios per 100,000 be increased to account for the older population. The age/sex detail designed into the staffing module permits this adjustment to be performed automatically.

2.2.3 The Integrated Requirements Calculation Module

This module calculates the integrated practitioner requirements estimates and controls the generation of reports. The calculations are all straightforward, with most of the complicated work being completed in the other two modules.

The primary inputs to this module are:

- population counts, by age and sex, for each of eight aggregated health care delivery settings, as produced by the population assignment module;
- practitioner staffing models for each of eight aggregated health care delivery settings, as produced by the practitioner assignment module; and
- annual compensation levels for each of the four practitioner types.

Population counts are multiplied by the practitioner-population ratios contained in the staffing models. This multiplication takes place separately for each age/sex combination and practitioner type. Thus, the model calculates the requirements for each practitioner type to serve each age/sex population cell within each delivery setting. Adding over the age/sex cells then produces practitioner requirement totals by delivery setting. Once these delivery setting practitioner requirements have been calculated, practitioner compensation levels are applied to form an estimate of the total practitioner costs.

Module output includes population by insurance category; population by age, sex, and location; practitioners per 100,000 staffing ratios; and integrated requirements and costs reports. The output also includes a complete description of the user choices underlying the scenario. This provides a complete audit trail between the projections of the model and the underlying assumptions.

2.2.4 Limitations of the Methodology

Discussion of the limitations of the methodology is divided into two parts:

- limitations related to model design; and
- limitations due to inadequate data.

The first set of limitations is inherent in the design of the model and arises from the particular set of simplifying assumptions upon which the model is based. Limitations of the second type relate to difficulties in obtaining the data necessary to implement the model design to its fullest.

2.2.4.1 *Limitations Due to Model Design*

In addition to significant advantages, the capitated model design also results in certain limitations. In some instances, the advantages and limitations are one and the same. For example, a major advantage of this approach is that it avoids having to develop an operational definition of primary care services. Instead, the model focuses directly upon primary care practitioners. The limitation of this approach is that it ignores that component of primary care services that are provided by non-primary care practitioners. On balance, this limitation is outweighed by the increased tractability of the capitated approach.

A closely related limitation is the restriction of the model to primary care practitioners. It is recommended that the model eventually be expanded to include specialists and other caregivers that are not included in this first step toward a fully-integrated requirements model. Once this expansion is accomplished, the full implications of alternative staffing patterns on practitioner requirements can be analyzed under alternative scenarios.

The elimination of visits as the unit of supply and demand brings both advantages and limitations. The primary advantage is the avoidance of problems associated with adjusting visit measures to where they can be considered comparable across alternate data sources and provider types. The limitation is that the model avoids making statements about which practitioner is providing what kinds of visits. Again, from a practical viewpoint, the advantages outweigh the limitations.

It is noted in passing that while the model is designed to incorporate empirically observed staffing models, this does not restrict the model from providing requirements estimates under purely hypothetical staffing models. For example, one could construct a staffing model under the hypothetical assumption that the use of PAs, NPs, and CNMs is doubled over current levels and that the use of physicians is reduced in such a way as to leave access unchanged.

2.2.4.2 Limitations Due to Inadequate Data

In addition to limitations associated with model design, there are other limitations arising from a lack of data. For example, it was impossible to obtain the necessary data from a number of HMOs concerning the size and characteristics of the population served and the number and types of practitioners employed. As a result, no empirically-based staffing models based upon particular HMOs were included in the provided scenarios. With the right data, it would be possible to estimate production functions that relate the size and mix of practitioners to the number of persons served and other HMO characteristics. This would then permit measurement of productivity rates by practitioner type stated in terms of persons served (as opposed to the usual output measure of visits). It would also permit the development, through extrapolation, of potentially applicable staffing combinations not yet observed in practice.

3.0 ESTIMATION OF MODEL INPUTS AND PARAMETERS

This chapter discusses the development of model inputs, including estimations of population by insurance setting for all model years and estimations of base year staffing models. These inputs serve as the foundation from which scenarios are built.

The base year of the model is 1995 and the model is supplied with best estimates of the actual insurance distributions and staffing models for that year. In general, 1995 data were insufficient to develop these inputs at the needed level of detail. Therefore, a strategy was adopted under which detailed inputs were developed for 1992 and then adjusted to be consistent with the more aggregate information available for 1995.

3.1 ESTIMATION OF POPULATION BY INSURANCE SETTING

Two factors which are expected to have a profound effect on national health care utilization over time are changes in population demographics (e.g., changes in the age distribution of the population) and the growth of managed care. As described below, a variety of data sources were used to create a model which projects the distribution of the population across ten insurance categories over time, based on current and expected trends in managed care growth. The population distributions from this model are combined with Census population projections to forecast the number of individuals (by age group, sex, and urban/rural location) who are privately insured, uninsured, insured through Medicare, and insured through Medicaid in either a Fee-for-Service (FFS) setting¹, a Group/Staff HMO, or an IPA/Network HMO between 1992 and 2020.

A variety of data sources were used to estimate the 1992-1994 distribution of individuals across insurance settings and then to project forward through the year 2020 based on best estimates of future managed care penetration rates. The 1992 National Health Interview Survey (NHIS) was one of the main sources, and was used to provide a starting point for baseline projections. The NHIS files contain data on the demographic characteristics of each individual surveyed, as well as information about insurance status (i.e., whether the individual was privately insured, insured through Medicare, insured

¹ Those individuals in PPOs were included in the FFS category.

through Medicaid, or uninsured) and provider setting (i.e., FFS or managed care). The NHIS contains person-level weights for each observation to allow calculation of national-level estimates based on the survey sample.

Several published data sources were used to calibrate the population distribution model. These included data on managed care enrollment from GHAA publications, data on Medicare and Medicaid enrollment from various US government publications (including the percent of recipients in managed care), and insurance statistics published in the HIAA *Source Book of Health Insurance Data, 1993*. Census Bureau estimates of the population distribution across age categories were also used to calibrate the model.

Section 3.1.1 below describes the methodology for developing 1992 and 1994 estimates of the US population by age, sex, urban and rural status, and insurance status. Section 3.1.2 follows with a discussion of the methodology used to forecast the distributions through the year 2020. Note that estimates for the base year of the model (1995) had to be projected from the 1992 and 1994 estimates.

3.1.1 1992 and 1994 Estimates

Two steps were followed to estimate the number of individuals in each age-sex-urban/rural grouping across insurance/provider settings. First, an initial distribution was computed using the NHIS. Then, the distribution was calibrated so that the total number of individuals estimated to be in the ten insurance/provider categories agreed with estimates published by outside sources.

Step 1: Computing an Initial Distribution of Individuals Across Insurance Settings

The 1992 NHIS was used to estimate the number of individuals in each of the 320 cells, defined by age group,¹ sex, place of residence (i.e., by MSA/non-MSA), insurer type, and provider setting. Several problems arose regarding the placement of individuals into a particular insurance/provider category because: (1) some individuals had multiple insurers (e.g., both Medicare and Medicaid); (2) a large number of individuals reported

¹The age categories are 0-4, 5-17, 18-24, 25-44, 45-64, 65-74, 75-84, and 85+.

they were enrolled in mixed HMOs (which the NHIS defines as “an HMO combining a group, staff, or network model and an IPA model”); and (3) some individuals did not report or did not know their insurance/provider status. Approximately 41% of the NHIS sample (52,765 individuals) could not be categorized because they: (1) stated they were enrolled in a mixed HMO (n=1,742); (2) stated they were in an unidentified type of HMO (n=8,242); (3) stated they had private insurance, but did not provide sufficient data to determine their insurance setting (N=25,709); (4) did not know their insurance status (N=185); or (5) did not report their insurance status (N=16,887).¹

To solve these problems, the following rules were applied.

- All individuals 65 years and older were placed in the Medicare category.
- Individuals under age 65 who were both Medicare and Medicaid beneficiaries were placed in the Medicaid category.
- Observations on individuals who reported they were enrolled in a “mixed” or “other” HMO and individuals whose insurance setting could not be determined (i.e., if they were in an FFS or managed care setting) were deleted from the summary. Of those observations deleted, approximately 10% were Medicare recipients, 18% were Medicaid recipients, 60% were privately insured, and the insurance status for the remainder could not be determined.

Step 2: Calibrating the Model

For each age-sex-location grouping, the distribution of individuals across the ten insurance/provider settings was estimated. To compensate for the observations that were deleted, the number of individuals in each cell was adjusted upward until the number of individuals with Medicare, Medicaid, private insurance, and no insurance agreed with their corresponding population estimates published in the *1994 US Statistical Abstract* and

¹ It seems likely that those individuals in (3) should be classified fee-for-service and those individuals in (4) and (5) as uninsured. The age, sex, and urban/rural (weighted) distributions of (3) were compared against the corresponding distributions of the population identified as fee-for-service. The same distributions of individuals in (4) and (5) were compared against the corresponding distributions of those identified as uninsured. All distributions were very close. Thus, the method of scaling up the totals of the identified populations to match the totals published in the literature does not appear to bias the distributions.

HIAA's *Source Book of Health Insurance Data, 1993*. Likewise, population estimates for the number of Medicare, Medicaid, and privately insured individuals receiving care in a FFS setting, a Group/Staff HMO, and an IPA/Network were adjusted until the total populations in these categories agreed with estimates in the sources cited above (as well as GHAA's *National Directory of HMOs, 1991-1994*, and the US House of Representatives Committee on Ways and Means's *Overview of Entitlement Programs: 1994 Green Book*). Thus, the main purpose for using the NHIS is to estimate the distribution of the population in each age category across insurance settings. These distributions were estimated for both the 1992 and 1994 populations.

Several problems arose using the NHIS. First, the US population demographics obtained using the weights in the NHIS are different than the population demographics obtained using data provided by the Census Bureau. For example, a total population estimate of 251.5 million, with 78.1% living in an MSA, is obtained using the 1992 NHIS. However, using Census Bureau population estimates for 1992, combined with estimates of the percent living in an MSA, a population estimate of 255.1 million is obtained, with 80.1% living in an MSA.

The main reason for these discrepancies is that the NHIS data is representative of the civilian non-institutionalized population, while the Census estimates include the entire population. The entire population is needed here because: (1) the IRM, which this analysis supports, includes both Federal and Non-Federal physicians; and (2) trying to predict the percent of the population that would be institutionalized or in a non-civilian status through the year 2020 would increase the complexity of the IRM while providing only marginal benefits.

The Census population estimates and projections (from 1992 to 2020) are divided into the same age categories and urban/rural designations used for computing the insurance distributions from the NHIS. The number of individuals in each cell was estimated using the insurance distribution for each age-sex-location grouping and the corresponding population estimate for each grouping from the Census Bureau data. Since the Census Bureau population distribution across age, sex, and place of residence groupings was slightly different than that obtained using the adjusted NHIS data, slight adjustments to the initial insurance distributions were required to ensure that the total percent of the population

in the Medicare, Medicaid, Group/Staff HMO, IPA/Network HMO, and uninsured categories agreed with their corresponding estimates in the sources cited above. These recalibrations were made for both the 1992 and 1994 population distributions across insurance/provider settings. The population distribution estimates for each age-sex-urban/rural grouping for 1994 is provided in exhibit 3-1.

Exhibit 3-1 Distribution of the Population Across Insurance Type and Provider Setting, 1994

CATEGORY	AGE	MEDICARE			MEDICAID			PRIVATE INSURANCE			NO INSURANCE	Total
		FFS	HMO	IPA	FFS	HMO	IPA	FFS	HMO	IPA	FFS	
URBAN MALES	0-4	0.002	0.000	0.000	0.187	0.015	0.027	0.411	0.080	0.148	0.129	1.000
	5-17	0.002	0.000	0.000	0.113	0.009	0.012	0.473	0.079	0.159	0.153	1.000
	18-24	0.003	0.000	0.000	0.029	0.002	0.009	0.434	0.068	0.114	0.341	1.000
	25-44	0.009	0.000	0.000	0.023	0.004	0.002	0.511	0.086	0.163	0.202	1.000
	45-64	0.036	0.001	0.003	0.020	0.004	0.001	0.585	0.094	0.148	0.109	1.000
	65-74	0.906	0.040	0.054	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000
	75-84	0.901	0.051	0.049	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000
	85 +	0.942	0.018	0.040	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000
URBAN FEMALES	0-4	0.003	0.000	0.000	0.217	0.017	0.020	0.411	0.062	0.143	0.126	1.000
	5-17	0.002	0.000	0.000	0.122	0.005	0.011	0.487	0.077	0.143	0.154	1.000
	18-24	0.000	0.000	0.000	0.104	0.014	0.017	0.422	0.069	0.117	0.258	1.000
	25-44	0.005	0.000	0.000	0.064	0.004	0.005	0.505	0.090	0.173	0.155	1.000
	45-64	0.024	0.001	0.002	0.041	0.003	0.004	0.563	0.097	0.147	0.119	1.000
	65-74	0.906	0.040	0.054	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000
	75-84	0.908	0.038	0.054	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000
	85 +	0.930	0.030	0.040	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000
RURAL MALES	0-4	0.005	0.000	0.000	0.269	0.000	0.013	0.486	0.016	0.050	0.162	1.000
	5-17	0.001	0.000	0.000	0.129	0.000	0.006	0.592	0.017	0.055	0.200	1.000
	18-24	0.005	0.000	0.000	0.026	0.000	0.000	0.563	0.008	0.052	0.346	1.000
	25-44	0.014	0.000	0.000	0.033	0.000	0.003	0.633	0.023	0.056	0.238	1.000
	45-64	0.047	0.000	0.001	0.031	0.000	0.001	0.700	0.018	0.060	0.143	1.000
	65-74	0.966	0.011	0.023	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000
	75-84	0.974	0.007	0.019	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000
	85 +	0.995	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000
RURAL FEMALES	0-4	0.002	0.000	0.000	0.286	0.000	0.007	0.481	0.014	0.045	0.166	1.000
	5-17	0.001	0.000	0.000	0.124	0.000	0.006	0.601	0.018	0.055	0.196	1.000
	18-24	0.001	0.000	0.000	0.144	0.000	0.004	0.515	0.021	0.045	0.270	1.000
	25-44	0.005	0.000	0.000	0.079	0.000	0.006	0.632	0.021	0.064	0.194	1.000
	45-64	0.030	0.000	0.001	0.046	0.000	0.006	0.687	0.020	0.062	0.148	1.000
	65-74	0.974	0.011	0.015	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000
	75-84	0.978	0.003	0.019	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000
	85 +	0.974	0.000	0.026	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000

Source: Lewin-VHI estimates

3.1.2 Forecasts of Population by Insurance Setting

The final step in processing the population data by insurance setting was to project the distributions for each year from 1995 through 2020. To identify trends that would affect the distribution of the population across insurance settings over time, several sources, covering several years worth of data were used; namely, GHAA's *National Directory of HMOs*, GHAA's *HMO Industry Profile*, HIAA's *Source Book of Health Insurance Data*, and Decision Resources, Inc.'s *Interstudy Competitive Edge Industry Report 4.1*. Input was also sought from members of Lewin-VHI's Managed Care Practice Group.

A spreadsheet model was developed to tie the percentage of the population in the IPA/Network HMO and Group/Staff HMO categories to the expected HMO penetration level for each year through 2020. The model allows the user to adjust the managed care growth parameters to allow HMO growth to differ by insurer type, by urban/rural setting, and by IPA versus Group/Staff HMO. Based on analysis of managed care penetration increases in the Medicare, Medicaid, and privately insured populations, the population distribution across categories was projected over time. These estimates/forecasts of population in each of the major insurance categories through the year 2020 are shown in exhibits 3-2 through 3-5 at the end of this subsection.

In summary, the main purpose for creating the baseline population distributions is to be able to project the number of individuals (defined by age, sex, and place of residence) in each insurance category and each provider setting through the year 2020, based on current trends and changes in population demographics. Since the movement of a defined group of people (i.e., defined by age, sex, and urban/rural place of residence) between the four insurance categories — Medicare, Medicaid, privately insured, and uninsured — is mainly dependent on national policy and economic conditions (which are not explicitly represented in the model), the model assumes that changes in the percentage of the population in each of these four insurance categories is driven solely by changes in the age distribution of the national population. However, within the Medicare, Medicaid, and privately insured categories, there is a movement from FFS to managed care, with the growth of IPAs/Networks approximately twice that of Group/Staff HMOs.

For example, in the baseline projections the percent of the population enrolled in Medicare increases from 14% in 1992 to an estimated 17% in 2020. This increase is due

entirely to the general aging of the population. However, the proportion of Medicare recipients in managed care increases from an estimated 6% in 1992 to a projected 17% in 2020. This increase is based on trends from 1990 to 1994. It is quite possible, given the current political climate and budgetary issues surrounding Medicare and Medicaid, that the movement of Medicare and Medicaid recipients into managed care will happen more quickly than what would be suggested by historical trends. Baseline projections are not based on possible reform/policy scenarios. Instead, such scenarios may be analyzed using the IRM by replacing baseline projections with alternative distributions.

Exhibit 3-2: Distribution of Population by Insurance Setting, 1992

	URBAN		RURAL		U.S.	
	Population	Percent	Population	Percent	Population	Percent
Medicare (65+ population)	24,665,731	12%	7,619,075	15%	32,284,806	13%
Fee-for-Service	22,713,110	92%	7,452,785	98%	30,165,806	93%
Group/Staff HMO	965,218	4%	55,300	1%	1,020,517	3%
IPA/Network HMO	987,403	4%	110,990	1%	1,098,393	3%
Medicaid	20,228,950	10%	5,230,489	10%	25,459,438	10%
Fee-for-Service	18,649,952	92%	5,120,938	98%	23,770,891	93%
Group/Staff HMO	797,149	4%	0	0%	797,149	3%
IPA/Network HMO	781,849	4%	109,550	2%	891,399	4%
Other Insurance¹	130,077,185	64%	29,877,648	59%	159,954,833	62%
Fee-for-Service	95,395,350	73%	27,313,549	91%	122,708,898	77%
Group/Staff HMO	12,785,959	10%	666,674	2%	13,452,634	8%
IPA/Network HMO	21,895,876	17%	1,897,425	6%	23,793,301	15%
Uninsured	29,266,220	14%	8,116,622	16%	37,382,842	15%
Total Insured	174,971,866	86%	42,727,211	84%	217,699,077	85%
Fee-for-Service	136,758,412	78%	39,887,272	93%	176,645,685	81%
Group/Staff HMO	14,548,326	8%	721,974	2%	15,270,300	7%
IPA/Network HMO	23,665,128	14%	2,117,965	5%	25,783,093	12%
Total Population	204,238,086	100%	50,843,833	100%	255,081,919	100%

¹ Includes traditional indemnity plans, CHAMPUS, VA, other military health, and the under 65 Medicare Population.

Sources: Lewin-VHI estimates based on the 1992 National Health Interview Survey and GHAA, HIAA, and HCFA publications.

Exhibit 3-3: Distribution of Population by Insurance Setting, 1995

	URBAN		RURAL		U.S.	
	Population	Percent	Population	Percent	Population	Percent
Medicare (65+ population)	25,822,671	12%	7,825,843	15%	33,648,514	13%
Fee-for-Service	23,144,525	90%	7,589,066	97%	30,733,592	91%
Group/Staff HMO	1,118,536	4%	62,937	1%	1,181,474	4%
IPA/Network HMO	1,559,609	6%	173,839	2%	1,733,448	5%
Medicaid	16,053,166	8%	4,154,754	8%	20,207,920	8%
Fee-for-Service	13,139,449	82%	3,908,978	94%	17,048,427	84%
Group/Staff HMO	1,217,761	8%	0	0%	1,217,761	6%
IPA/Network HMO	1,695,956	11%	245,776	6%	1,941,732	10%
Other Insurance¹	138,550,383	65%	30,991,496	60%	169,541,879	64%
Fee-for-Service	88,325,922	64%	27,158,438	87%	115,484,360	68%
Group/Staff HMO	17,042,076	12%	904,459	3%	17,946,535	11%
IPA/Network HMO	33,182,385	24%	2,928,599	9%	36,110,984	21%
Uninsured	31,194,694	15%	8,840,759	17%	40,035,453	15%
Total Insured	180,426,220	85%	42,972,093	83%	223,398,313	85%
Fee-for-Service	124,609,897	69%	38,656,482	90%	163,266,379	73%
Group/Staff HMO	19,378,373	11%	967,397	2%	20,345,770	9%
IPA/Network HMO	36,437,950	20%	3,348,214	8%	39,786,164	18%
Total Population	211,620,914	100%	51,812,852	100%	263,433,766	100%

¹ Includes traditional indemnity plans, CHAMPUS, VA, other military health, and the under 65 Medicare Population.

Sources: Lewin-VHI estimates based on the 1992 National Health Interview Survey and GHAA, HIAA, and HCFA publications.

Exhibit 3-4: Predicted Distribution of Population by Insurance Setting, 2000

	URBAN		RURAL		U.S.	
	Population	Percent	Population	Percent	Population	Percent
Medicare (65+ population)	27,267,476	12%	8,054,253	16%	35,321,729	13%
Fee-for-Service	22,945,056	84%	7,669,858	95%	30,614,915	87%
Group/Staff HMO	1,571,737	6%	83,232	1%	1,654,969	5%
IPA/Network HMO	2,750,682	10%	301,163	4%	3,051,845	9%
Medicaid	16,654,456	7%	4,176,270	8%	20,830,725	8%
Fee-for-Service	12,026,190	72%	3,756,613	90%	15,782,803	76%
Group/Staff HMO	1,687,378	10%	0	0%	1,687,378	8%
IPA/Network HMO	2,940,888	18%	419,657	10%	3,360,545	16%
Other Insurance¹	146,625,592	66%	31,963,344	59%	178,588,937	65%
Fee-for-Service	63,919,474	44%	25,665,178	80%	89,584,652	50%
Group/Staff HMO	24,050,745	16%	1,237,570	4%	25,288,316	14%
IPA/Network HMO	58,655,373	40%	5,060,596	16%	63,715,969	36%
Uninsured	32,514,291	15%	8,984,911	17%	41,499,202	15%
Total Insured	190,547,524	85%	44,193,867	83%	234,741,391	85%
Fee-for-Service	98,890,720	52%	37,091,649	84%	135,982,369	58%
Group/Staff HMO	27,309,860	14%	1,320,802	3%	28,630,662	12%
IPA/Network HMO	64,346,943	34%	5,781,416	13%	70,128,359	30%
Total Population	223,061,815	100%	53,178,778	100%	276,240,593	100%

¹ Includes traditional indemnity plans, CHAMPUS, VA, other military health, and the under 65 Medicare Population.

Sources: Lewin-VHI estimates based on the 1992 National Health Interview Survey and GHAA, HIAA, and HCFA publications.

Exhibit 3-5: Distribution of Population by Insurance Setting, 2020

	URBAN		RURAL		U.S.	
	Population	Percent	Population	Percent	Population	Percent
Medicare (65+ population)	42,245,669	16%	11,102,175	20%	53,347,844	16%
Fee-for-Service	31,737,126	75%	10,232,493	92%	41,969,619	79%
Group/Staff HMO	3,242,702	8%	162,194	1%	3,404,896	6%
IPA/Network HMO	7,265,841	17%	707,488	6%	7,973,329	15%
Medicaid	19,004,327	7%	4,078,852	7%	23,083,179	7%
Fee-for-Service	10,626,231	56%	3,371,224	83%	13,997,455	61%
Group/Staff HMO	2,611,549	14%	0	0%	2,611,549	11%
IPA/Network HMO	5,766,547	30%	707,628	17%	6,474,175	28%
Other Insurance¹	171,045,462	63%	32,371,025	57%	203,419,487	62%
Fee-for-Service	18,069,047	11%	22,012,124	68%	40,081,171	20%
Group/Staff HMO	37,487,282	22%	1,654,739	5%	39,142,021	19%
IPA/Network HMO	115,489,133	68%	8,704,162	27%	124,196,295	61%
Uninsured	37,252,009	14%	8,842,298	16%	46,094,307	14%
Total Insured	232,295,458	86%	47,552,052	84%	279,847,510	86%
Fee-for-Service	60,432,404	26%	35,615,842	75%	96,048,245	34%
Group/Staff HMO	43,341,534	19%	1,816,933	4%	45,158,467	16%
IPA/Network HMO	128,521,520	55%	10,119,278	21%	138,640,798	50%
Total Population	269,547,467	100%	56,394,350	100%	325,941,817	100%

¹ Includes traditional indemnity plans, CHAMPUS, VA, other military health, and the under 65 Medicare Population.

Sources: Lewin-VHI estimates based on the 1992 National Health Interview Survey and GHAA, HIAA, and HCFA publications.

3.2 ESTIMATION OF 1992 STAFFING MODELS

This section describes the methodology used to compute the base year (1995) staffing models for primary care providers. These staffing models are stated in terms of the number of physicians, PAs, NPs, and CNMs required per 100,000 individuals in each of the eight health care delivery settings defined in the IRM. These eight health care delivery settings are the insured FFS population, Group/Staff HMO enrollees, IPA/Network HMO enrollees, and the uninsured, separated into urban (MSA) and rural (non-MSA) locations.¹ Each of these populations is mutually exclusive, and every individual in the US is a member of one of these categories.

Staffing models are developed first for the year 1992, since data limitations do not permit direct estimates for 1995. These 1992 models are then adjusted as needed to be consistent with what is known about 1995.

3.2.1 Estimation of Physician Ratios Per 100,000 Population

The specialties included in the definition of primary care are general practice and family practice (GP & FP), internal medicine (IM), pediatrics (PED), and Obstetrician Gynecologists (OB/GYNs). Both Medical Doctors (MDs) and Osteopaths (DOs) are included in the definition, as well as both non-Federal and Federal physicians who are actively involved in direct patient care.

¹Although the ultimate objective was to determine staffing ratios for the 8 broad categories defined above, actual analysis was done with 20 more-detailed categories. For both urban and rural locations, the following 10 subcategories were defined:

Fee-for-Service: 1) Medicare; 2) Medicaid; 3) Privately Insured; and 4) Uninsured.

Managed Care — Group/Staff: 5) Medicare; 6) Medicaid; and 7) Privately Insured.

Managed Care — IPA & Network: 8) Medicare; 9) Medicaid; and 10) Privately Insured.

This more detailed categorization takes into account the demographic composition of the more broadly-defined categories.

3.2.1.1 Data Sources and Definitional Issues in Physician Populations

This subsection discusses the data sources used, and definitional issues faced, in calculating the number of primary care physicians. The data, issues, and assumptions used concerning utilization, insurance populations, physician supply, and physician productivity are discussed. A cursory survey of the literature concerning physician staffing ratio estimates is also provided.

3.2.1.1.1 Utilization and Insurance Population Data

Several data sources were used to develop the estimates of the staffing ratios and to provide alternatives for comparison. The 1992 National Health Interview Survey was used to determine the size and composition of the population enrolled in each insurance category, as well as to estimate utilization rates. The NHIS is a household survey conducted by the National Center for Health Statistics (NCHS). The NHIS files contain detailed information about the characteristics of the interviewee (e.g., age, sex, race), the interviewee's insurance status (e.g., if they receive Medicare, Medicaid, or are privately insured), and if the interviewee is enrolled in an HMO. In addition, interviewees were asked the number of contacts they had with a health care provider during the two weeks prior to the survey.¹ For each reported contact, the survey contains data on the type of provider contacted (e.g., the provider's specialty, if a nurse or MD was seen, etc.) and the location of the contact (e.g., office, hospital, etc.). Person-level weights are provided for each observation to allow one to make national-level estimates of the total number of visits and to control for oversampling of the poor and minorities.

¹All patient-physician contacts reported in the NHIS are counted as visits in this analysis, except for telephone contacts.

3.2.1.1.2 Physician Supply and Productivity

Data were obtained on the number of practicing physicians in 1992 from several sources. The main source was the Area Resource File (ARF) which has county-level estimates of the number of physicians by specialty and by practice status (e.g., inpatient care, in an office, or hospital). The ARF's physician estimates are based on the AMA's Physician Master File. The ARF, however, does not contain 1992 data on DOs, but does contain 1989 data on DOs. An estimate of the total number of Osteopaths in the US in 1992, categorized as residing in MSA or non-MSA settings, was obtained from the American Osteopathic Association (AOA). Both the AOA 1992 data and the 1989 ARF data were used to estimate DO supply by specialty and MSA/non-MSA setting for 1992.

The 1990 National Ambulatory Medical Care Survey (NAMCS) was used to help determine if significant differences in physician productivity exist across insurance and MSA/non-MSA settings (where productivity is defined as the average annual number of patients seen by physicians in a particular setting). The NAMCS collects data on a random sample of patients who visit a physician's office. Physicians record data on a sample of their patients (for example, every fifth patient, depending on the number of patients the physician usually sees during a given period of time). In addition to collecting information on each patient's demographic characteristics, the NAMCS collects data on reasons for each visit, the duration of each visit, and expected sources of payment for the visit. The NAMCS does not allow one to directly estimate differences in annual patient visits by physicians; however, visit duration can be used as a proxy for physician productivity.

Estimates of the national total number of office visits to primary care physicians and OB/GYNs from the 1990 NAMCS were compared to the 1992 NHIS. An estimated 62,129,300 visits were made to office-based OB/GYNs in 1992, based on the NHIS; an estimated 61,242,900 visits were made in 1990, based on the NAMCS. The number of office visits to primary care physicians, based on the NHIS, is 518,037,115. The corresponding estimate from the NAMCS is 385,859,314, which is approximately 75% of the NHIS estimate. This difference is likely due to the self-reported specialty data on the

NHIS. The NHIS reports fewer specialty visits than the NAMCS, so it may be that individuals surveyed in the NHIS sometimes mistaken their visit to a specialist for a primary care visit.

Physician practice-level data was also investigated, namely the AMA Group File, to determine the number of physicians practicing in fee-for-service and managed care settings. However, this source proved to be of limited use because of the low response rate to many of the questions in the survey and the lack of detailed information on the demographic composition of each practice's patient base.

3.2.1.1.3 A Survey of the Literature

Several published reports/papers provide estimates of staffing ratios that are useful for comparison purposes. One such report is the GHAA *1993 HMO Industry Profile*. The *Profile* contains summary statistics from a survey of HMOs, and also contains estimates of staffing per 1,000 enrollees for different types of physicians in both group and staff HMOs.¹ The *Profile* provides staffing ratio estimates for primary care physicians, specialists, and non-physician providers (i.e., physician assistants, nurse practitioners and certified nurse-midwives); however, the GHAA staffing ratio estimates have several limitations. First, the staffing ratios are based on a very small number of HMOs. The large variance in staffing ratios across HMOs, combined with the small sample sizes, results in estimates which are not (for the most part) statistically significant at any acceptable level of significance. Second, the GHAA survey did not collect sufficient data on the demographic composition of each HMO's enrollment base to determine if the

¹Staffing ratios were not computed for IPAs and network HMOs because the GHAA data does not indicate the percent of a physician's time treating managed care enrollees. Since physicians affiliated with IPAs and networks devote differing amounts of time to managed care patients, GHAA was not able to compute the number of FTEs needed to staff an IPA or network HMO.

HMOs that participated in the GHAA survey are representative of the entire managed care industry.

Jonathan Weiner's 1994 JAMA article, *Forecasting the Effects of Health Reform on US Physician Workforce Requirement*, was another source for comparison. His paper provides a model for forecasting the US physician workforce under various health care reform scenarios. However, part of Weiner's analysis is heavily based on data from a small sample of large HMOs (enrollment > 100,000) in the Pacific Coast states, which are not necessarily representative of the HMO industry.¹

3.2.1.2 Assignment of Physicians to Urban and Rural Settings

The ARF and information from the AOA were used to determine the total number of physicians residing in MSA and non-MSA locations in 1992.² The ARF is a county-level database, and each county is identified as either a MSA or a non-MSA. By using the ARF, the total number of primary care physicians and OB/GYNs in both MSAs and non-MSAs for 1992 was calculated. The ARF does not contain 1992 data on the number of DOs in each specialty area, but does contain such data for 1989. To estimate the number of DOs involved in primary care and OB/GYN in 1992, the following data sources were used:

- the total number of DOs in MSAs and non-MSAs in 1992 (supplied by the AOA); and
- the percent of DOs in 1989 involved in direct patient primary care and OB/GYN (calculated from the ARF).

¹Large HMOs (enrollment > 100,000) enrolled approximately 68% of all managed care enrollees in 1992.

²The physician data in the ARF is based on the AMA's Physician Master File, and the Osteopath data is based on the AOA's Physician Microdata File.

Exhibits 3-6 and 3-7 show findings regarding the assignment of physicians to urban and rural settings. Note that these counts exclude interns and residents.

**Exhibit 3-6: Primary Care MDs and DOs in the US, 1992
(Excludes Residents and Clinical Fellows)**

Location	Non-Federal MDs	Federal MDs	DOs	Total
Urban	122,940	3,110	14,070	140,120
Rural	21,909	587	3,907	26,403
US	144,849	3,697	17,977	166,523

Sources: Lewin-VHI estimates, AMA, and AOA.

**Exhibit 3-7: OB/GYNs in the US, 1992
(Excludes Residents and Clinical Fellows)**

Location	Non-Federal MDs	Federal MDs	DOs	Total
Urban	22,445	410	697	23,552
Rural	2,438	65	128	2,631
US	24,883	475	825	26,183

Sources: Lewin-VHI estimates, AMA, and AOA.

3.2.1.3 Assignment of Physician FTEs to Insurance Settings

This subsection describes the approach used to distribute primary care physician FTEs across insurance settings for each location. The primary information used in distributing physician FTEs across insurance settings was the number of visits occurring in each insurance setting. OB/GYN FTEs and other primary care physician FTEs were distributed separately. For OB/GYNs, the type of visits used were obstetrical/gynecological visits. For other primary care physicians, total primary care visits (including OB/GYN visits) were used. Obstetrical visits were included in the visits used to distribute non-obstetric physicians because these physicians do provide some obstetric care. OB/GYN and total primary care visits by insurance setting for each location are reported in exhibit 3-8 on the following page.

For each location setting, the specific method for computing OB/GYN FTEs in each insurance setting was to multiply the total number of OB/GYNs for each location setting times the proportion of OB/GYN visits provided in each insurance setting for the given location. For example, the total number of urban OB/GYNs, as reported in the previous section, was 23,552. The percentage of urban OB/GYN visits occurring in staff HMOs, from exhibit 3-8, was roughly 7.62%. Therefore, the number of urban staff HMO OB/GYN FTEs was estimated at 1,795, the product of multiplying 23,552 times 7.62%. Likewise, the specific method for computing other primary care physician FTEs in each insurance setting was to multiply the total number of other primary care physicians for each location times the proportion of other primary care visits provided in each insurance setting for the given location.

Exhibit 3-8: Distribution of Obstetric/Gynecological and Total Primary Care Visits by Insurance Setting and Location, 1992

I. Visits by Insurance Setting and Location

Insurance Setting	Obstetric/Gynecological Visits		Total Primary Care Visits	
	Urban	Rural	Urban	Rural
Staff HMO	5,134,064	188,382	41,806,757	2,012,756
IPA HMO	8,347,447	580,086	74,821,363	7,002,710
Fee-for-Service	47,971,135	9,675,307	448,932,163	135,861,318
Uninsured	5,893,522	957,241	51,918,496	15,205,045
Total US	67,346,168	11,401,016	617,478,779	160,081,829

II. Percentage Distribution Across Insurance Setting for Each Location

Insurance Setting	Obstetric/Gynecological Visits		Total Primary Care Visits	
	Urban	Rural	Urban	Rural
Staff HMO	7.62%	1.65%	6.77%	1.26%
IPA HMO	12.39%	5.09%	12.12%	4.37%
Fee-for-Service	71.23%	84.86%	72.70%	84.87%
Uninsured	8.75%	8.40%	8.41%	9.50%
Total US	100.00%	100.00%	100.00%	100.00%

After the OB/GYN and other primary care physician FTEs were distributed by insurance setting for each location, they were summed for each insurance setting to yield one physician FTE measure for each insurance setting and location. The number of primary care physician FTEs by insurance setting is reported in exhibit 3-9.

Exhibit 3-9: Distribution of Primary Care Physician FTEs Across Insurance Setting and Location, 1992

Insurance Setting	Obstetrician/ Gynecologists			Other Primary Care Physicians			Total Primary Care Physicians		
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Staff HMO	1,795	43	1,838	9,604	339	9,943	11,399	382	11,781
IPA HMO	2,919	134	3,053	17,017	1,168	18,185	19,936	1,302	21,238
Fee-for-Service	16,776	2,233	19,009	101,670	22,408	124,078	118,446	24,641	143,087
Uninsured	2,061	221	2,282	11,829	2,488	14,317	13,890	2,709	16,599
Total US	23,551	2,631	26,182	140,120	26,403	166,523	163,671	29,034	192,705

3.2.2 Estimation of Nurse Practitioner and Certified Nurse-Midwife (CNM) Ratios Per 100,000 Population, 1992

This subsection discusses the data sources used and definitional issues faced in calculating the number of primary care nurse practitioners and certified nurse-midwives. Data, issues, and assumptions concerning nurse practitioners and certified nurse-midwives are discussed.

3.2.2.1 Data Sources and Definitional Issues in Defining Nurse Populations

Two national databases were used for developing the estimates for nurse practitioners. These are the databases developed from the Certified Nurse Practitioner and Clinical Nurse Specialist (CNP/CNS) Survey (Washington Consulting Group, 1994) and the Fifth National Sample Survey of Registered Nurses (denoted as RN-V; Moses, 1994). Both of these databases contain data on nurse practitioners for 1992. The CNP/CNS database gives comprehensive coverage of nationally certified or state-recognized nurse practitioners and

provides the data necessary to identify nurse practitioners who are functioning as nurse practitioners and are offering patient care in an ambulatory setting.

3.2.2.1.1 Percentage of Nurse Practitioners Employed in HMOs

The percentage of nurse practitioners employed in HMOs is not precisely known because of the difficulty in establishing the type of HMO in which they are employed and the small sample that is available for making estimates. It was assumed that respondents to the RN-V and CNP/CNS questionnaires who marked the HMO setting worked in a group or staff model HMO. If they had worked in an IPA or network HMO, they would probably have indicated that they work in an FFS type of arrangement; however, this is only an assumption and cannot be verified from the survey results.

Based on this assumption, the RN-V data indicate that 6.5% of nurse practitioners employed in nursing in an ambulatory setting are employed in an HMO. Looking at the certified nurse practitioner population from the RN-V database who are employed in an HMO, the percentage increases to 7.8%; however, these estimates are based on just 28 and 23 responses, respectively.

The percentage from the CNP/CNS database indicates that 7.2% of certified nurse practitioners are employed in HMOs. Because this percentage is based on 100 responses, it is a better statistic; however, the population includes only certified nurse practitioners. The estimate from the RN-V data that includes non-certified nurse practitioners is lower (i.e., 6.5%). Based on these findings, the percentage of NPs providing primary care in HMOs is estimated at 7.0%.

3.2.2.1.2 Percentage of Nurse Practitioners Providing Care to the Uninsured

The CNP/CNS database also provides information on the percentage of patients a nurse practitioner sees who are self-payors or who have no source of payment. Using this information, the average number of hours they work per week, and assuming the average length of a patient visit for all types of health coverage does not vary, hours per week spent in caring for the self-pay and no-pay patients was estimated.

Assuming a 40-hour work week, an equivalent number of nurse practitioners providing services to patients with each type of health care coverage was developed. Converting these values into a percentage, it was estimated that an equivalent of 11.1% of NPs provide services to self-paying patients and 13.5% of NPs provide services to patients who do not have a source of payment. It is recognized that some of the self-pay patients may receive an insurance payment that is unknown to the responding nurse practitioner; however, there is no means for determining the extent of this practice. Therefore, in order to avoid overestimating the number of NPs serving the uninsured, NPs who serve self-payors have been treated as if they treated insured patients.

The above discussion indicates the availability of estimates for NPs in group/staff HMOs and for the uninsured. Data are not available that permit directly estimating the number of NPs in the other categories for which data are needed in the model.

3.2.2.1.3 Percentage of Certified Nurse-Midwives (CNMs) Employed in HMOs

RN-V data on CNMs working in HMOs are inadequate for making this estimate; thus, other sources were consulted. Walsh and DeJoseph (1993) reported on data collected from July 1991 to April 1992 as part of the annual American College of Nurse-Midwives (ACNM) membership survey. Included in their analysis was information on the CNMs' primary employers. They reported that an HMO was the primary employer for 7.6% of CNMs.

Paine (1992) using ACNM data, estimated that 8% of CNMs in full-scope clinical practice were employed in HMOs. Because some CNMs selected more than one setting, the sum of the percentages summed to 105.1. Assuming equal distribution of the multiplicity, the value was adjusted to 7.6% (8.0/1.051).

Scupholme, DeJoseph, Strobino, and Pain (1992) and colleagues also reported the settings in which CNMs practiced; again, the CNMs were permitted to indicate multiple settings. An estimated 10% of the CNMs indicated that they practiced in HMOs. Because of the multiple settings, the sum of the percentages was 140. Adjusting the result as before, the percentage practicing in HMOs is 7.1%, similar to the previous estimate.

Based on the results of these three studies, the percentages of CNMs employed in HMOs is estimated to be 7.6%. Data are not available that permit directly estimating the number of CNMs in the other categories for which data are needed in the model.

3.2.2.2 Assignment of NPs into Urban and Rural Settings

Using special tabulations of the CNP/CNS database prepared by Evelyn Moses, HRSA, BHP, Division of Nursing, estimates of these nurse practitioners serving in MSAs and non-MSAs were obtained. The estimates indicate that 16,148 CNPs provided patient care in ambulatory settings located in MSAs and 2,819 in settings located in non-MSAs. There were an estimated 325 NPs for whom MSA status was not known. The nonrespondents were assumed to be distributed in the same proportions as the respondents.

The above indicates the status of the CNPs; however, some nurses who were prepared as nurse practitioners may be functioning as nurse practitioners and not be nationally certified or state recognized. These NPs would not be captured in the CNP/CNS database. To obtain estimates of this non-certified population, the RN-V database was used. NPs were identified who were prepared as a nurse practitioner in a program of three months or more in duration, were working in the US in an ambulatory setting, were not certified,

were providing some direct patient care, and had the title of nurse practitioner. An estimated 3,078 nurses met these criteria. Of these, an estimated 2,436 served in urban settings and 642 in rural settings. Exhibit 3-10 provides a summary of the data from the CNP/CNS and RN-V databases. Overall, an estimated 22,045 NPs met the criteria, with 18,584 serving in urban settings and 3,461 in rural settings.

**Exhibit 3-10: Estimated Number of Nurse Practitioners
in Urban and Rural Settings, 1992**

Certification Status	Urban	Rural	Total
Certified NP ¹	16,148	2,819	18,967
Non-Certified NP ²	2,436	642	3,078
Total	18,584	3,461	22,045

1. Based on tabulations prepared by Evelyn B. Moses, Division of Nursing, using the CNP/CNS database.
2. Based on tabulations prepared by Research Triangle Institute using the RN-V database.

3.2.2.3 Assignment of CNMs into Urban and Rural Settings

CNM data are available from the RN-V database and from the literature cited in subsection 3.2.2.1.3. The RN-V database was used to estimate the number of CNMs and an ACNM representative was contacted to ensure the values were consistent with their data. The estimate of CNMs was based on the nurses who completed a formal education program of at least 3 months, were certified, and provide direct patient care. An estimated 4,134 CNMs met these criteria. The number of CNMs serving in urban and rural areas was also assessed. An estimated 78.1% of CNMs practiced in urban areas and 21.9%

practiced in rural areas. Exhibit 3-11 provides a summary of the breakdown of CNMs into urban and rural settings.

Exhibit 3-11: Estimated Number of Certified Nurse-Midwives in Urban and Rural Settings, 1992

	Number of Certified Nurse-Midwives		
	Urban	Rural	Total
Total Estimate	3,229	905	4,134
Percent	78.1	21.9	100.0

3.2.2.4 Assignment of NPs and CNMs to Insurance Settings

This section describes the approach used to distribute NP and CNM FTEs across insurance settings for each location. The primary information used in distributing NP FTEs across insurance settings was the number of total primary care visits occurring in each insurance setting. For CNM FTEs, OB/GYN visits were used. OB/GYN and total primary care visits by insurance setting for each location were reported in exhibit 3-8.

There were two steps involved in distributing NP and CNM FTEs across insurance settings for each location. In the first step, FTEs were distributed across insurance setting without incorporating specific knowledge about the number of FTEs practicing in a given insurance setting. In the second step, the number of FTEs allocated to each insurance setting were refined to account for previous specific knowledge about FTEs practicing in certain insurance settings. For instance, it was previously estimated that 1,543 NPs were practicing in staff HMOs, and 2,447 were practicing among the uninsured. Also, it was previously estimated that 322 CNMs were practicing in staff HMOs.

The approach used in incorporating previous specific knowledge into the FTE distributions accounted for the fact that while the initial distributions were computed by insurance setting *and* location, the previously estimated FTEs were known by insurance setting only — not by location. The exact approach involved:

- summing the total FTEs from the initial distribution across location for the insurance settings for which previous specific knowledge was available;
- computing the ratio of the known FTEs to the summed initial distribution for these insurance settings;
- multiplying both the urban and rural initial distributions for the given insurance setting by the ratio computed in the previous step (the effect of this step was to ensure that the sum of the adjusted allocations across location for the given insurance setting was equal to the known estimate); and
- adjusting the initial distributions for the remaining insurance settings proportionally so that the sum of adjusted FTEs across insurance setting for each location was equal to the total FTEs derived in section 3.2.2.2.

The adjusted NP and CNM FTEs by insurance setting and location are presented in exhibit 3-12.

Exhibit 3-12: Distribution of NP and CNM FTEs Across Insurance Setting and Location, 1992

Insurance Setting	Nurse Practitioners			Certified Nurse-Midwives		
	Urban	Rural	Total	Urban	Rural	Total
Staff HMO	1,491	52	1,543	296	18	314
IPA HMO	2,097	143	2,240	394	46	440
Fee-for-Service	12,532	2,753	15,285	2,262	765	3,027
Uninsured	2,464	512	2,976	278	76	354
Total US	18,584	3,460	22,044	3,230	905	4,135

3.2.3 Estimation of Physician Assistant Ratios Per 100,000, 1992

This subsection discusses the data sources used and definitional issues faced in calculating the number of primary care Physician Assistants (PAs). Data, issues, and assumptions concerning the allocation of PAs to locations and insurance settings are discussed.

3.2.3.1 Data Sources and Definitional Issues in PA Populations

The PA population is less diverse than the advanced practice nursing population; consequently, there were fewer problems with multiple preparations and different databases. The American Academy of Physician Assistants (AAPA, 1992) reported that of the 25,333 graduates of PA programs, 21,633 are practicing as PAs. The association also reported that 46.6% of the PAs practice in the primary care specialties of family/general medicine, obstetrics/gynecology, general internal medicine, general pediatrics, public health, and preventive medicine. The product of the number of practicing PAs (21,633) and the proportion of PAs providing primary care (46.6%) provides an estimate of the number of PAs providing primary care services: 10,081.

3.2.3.1.1 Percentage of PAs Employed in HMOs

The AAPA *1992 Census Report on Physician Assistants* also indicates that 7.2% of the PAs in primary care have an HMO employment setting. This percentage yields 726 PAs and is used to estimate the number of PAs working in HMOs. Data on the other parameters were unavailable.

3.2.3.2 Assignment of PAs into Urban and Rural Settings

The AAPA obtains information on the size of the community in which the PA practices. This is difficult to translate into the number who work in urban and rural areas.

The only source of information that was found for making these estimates was some preliminary data obtained from the WAMI Rural Health Research Center (Dr. Gary Hart, personal communications, University of Washington, Seattle, WA, 1995). Their preliminary unweighted data indicate that 37.9% of primary care PAs work in non-MSA areas. This percentage was used for establishing the number of PAs working in urban and rural areas. Exhibit 3-13 shows the breakdown of PAs into urban and rural settings.

Exhibit 3-13: Physician Assistants by Location, 1992

	Number of Physician Assistants		
	Urban	Rural	Total
Total Estimate	6,260	3,821	10,081 ¹
Percent ²	62.1	37.9	100.0

1. Estimates based on data contained in the *1992 Census Report on Physician Assistants* (AAPA, 1992).

2. Based on data obtained from the WAMI Rural Health Research Center.

3.2.3.3 Assignment of PAs Into Insurance Settings

This section describes the approach used to distribute PA FTEs across insurance settings for each location. The primary information used in distributing PA FTEs across insurance settings was the number of total primary care visits occurring in each insurance setting. Total primary care visits by insurance setting for each location were reported in exhibit 3-8.

There were two steps involved in distributing PA FTEs across insurance settings for each location. In the first step, FTEs were distributed across insurance setting without incorporating specific knowledge about the number of FTEs practicing in a given insurance

setting. In the second step, the number of FTEs allocated to each insurance setting were refined to account for previous specific knowledge about FTEs practicing in certain insurance settings. In particular, it was previously estimated that 726 PAs were practicing in staff HMOs.

The approach used in incorporating previous specific knowledge into the FTE distributions accounted for the fact that while the initial distributions were computed by insurance setting *and* location, the previously estimated FTEs were known by insurance setting only — not by location. The exact approach involved:

- summing the total FTEs from the initial distribution across location for the insurance settings for which previous specific knowledge was available;
- computing the ratio of the known FTEs to the summed initial distribution for these insurance settings;
- multiplying both the urban and rural initial distributions for the given insurance setting by the ratio computed in the previous step (the effect of this step was to ensure that the sum of the adjusted allocations across location for the given insurance setting was equal to the known estimate); and
- adjusting the initial distributions for the remaining insurance settings proportionally so that the sum of adjusted FTEs across insurance setting for each location is equal to the total FTEs derived in section 3.2.3.2.

The adjusted PA FTEs by insurance setting and location are presented in exhibit 3-14.

Exhibit 3-14: Distribution of PA FTEs Across Insurance Setting and Location, 1992

Insurance Setting	Physician Assistants		
	Urban	Rural	Total
Staff HMO	652	74	726
IPA HMO	731	168	899
Fee-for-Service	4,369	3,221	7,590
Uninsured	508	358	866
Total US	6,260	3,821	10,081

3.2.4 Estimation of Practitioner Ratios Per 100,000 Population, 1992

This subsection discusses the estimation of practitioners per 100,000 population by practitioner type, location, insurance setting, and population age and sex. The previous sections in this chapter have discussed the derivation of practitioner FTEs by practitioner type, location, and insurance setting. This section discusses the use of information residing in the BHP_r Physician Requirements Model to obtain estimates of primary care physician requirements by insurance setting and population age and sex. In order to make use of both sets of information to estimate FTE requirements by all dimensions needed, the analysis made use of a statistical algorithm, called the *iterative proportional fitting* algorithm (IPF). This subsection contains three subsections. Subsection 3.2.4.1 provides an analytical overview of the approach used. Subsection 3.2.4.2 discusses using the BHP_r Physician Requirements Model to estimate FTEs required by insurance setting and population age and sex. Subsection 3.2.4.3 presents the results of the IPF.

3.2.4.1 Overview of Analytical Approach

As stated previously, the objective of this activity was to obtain FTEs required per 100,000 population by practitioner type, location, insurance setting, and population age and sex. Because these per capita ratios can be computed straightforwardly by dividing base year FTEs required by base year population (by practitioner type, location, insurance setting, and population age and sex), the focus of the analysis was on deriving the base year FTEs required at the needed level of detail. In previous discussions, FTE requirements were derived by practitioner type for each location and insurance setting. For analysis purposes, it was also known that the BHP_r Physician Requirements Model data inputs could be used to compute physician FTE requirements by population age and sex, for each insurance setting and location (under certain assumptions)¹. Therefore, for each location and insurance setting, FTE requirements could be observed by practitioner type, or by age and sex, but not readily by the cross product. The analytical problem was, thus, one of estimating FTE requirements simultaneously, by practitioner type and age and sex, that would preserve the FTE requirements observed separately for practitioner type and for population age and sex.

The IPF is a statistical algorithm that estimates cross-products of the type desired, given the totals for each dimension². For each insurance type and location, it requires two main inputs:

- FTEs required by practitioner type; and
- FTEs required by population age and sex.

¹The Physician Requirements Model inputs are documented in detail in *Refinements to BHP_r Physician Requirements Forecasting Model*, (VRI-HRSA-11 FR93-1(R)), Vector Research, Incorporated, Ann Arbor, Michigan, 30 April 1993

²The IPF is discussed in *Discrete Multivariate Analysis: Theory and Practice*, Bishop, Fienberg and Holland, MIT Press, Cambridge, Massachusetts, 1977, pp. 83-102.

Once the IPF estimates the required FTEs by practitioner type and age and sex for each location and insurance setting, the output is divided by the base year population corresponding to each location, insurance setting, age, and sex. This number was then multiplied by 100,000 to compute the ratio of FTEs required per 100,000 for each level of detail.

3.2.4.2 Estimating FTE Requirements by Population Age and Sex for Each Location and Insurance Status

The BHP_r Physician Requirements Model forecasts requirements of physician FTEs based upon population level and demographics, utilization rates, insurance status, and physician productivity. Using the input files to the Physician Requirements Model, primarily utilization rates and physician productivity rates, it was possible to determine the implicit level of primary care FTEs required for each population age and sex category by insurance status. While the Physician Requirements Model projects requirements for 18 specialties, only the inputs for the generally recognized primary care specialties of general/family practice, general internal medicine, pediatrics, and obstetrics/gynecology were employed in this effort. The basic steps involved:

- multiplying 1992 populations by primary care utilization rates to determine the level of primary care services required;
- multiplying the average number of physician minutes required for each service to determine total physician time required; and
- dividing the time required by the average number of minutes physicians spend working each year to obtain the FTEs required.

It should be noted that prior to being input into the IPF, the FTE requirements by age and sex are rescaled so that the sum of requirements across all age and sex combinations match the sum of requirements across practitioner types, for each insurance setting and

location. Therefore, the importance of the information obtained from the Physician Requirements Model is that relative differences in FTE requirements from one age/sex category to another are adequately reflected, rather than the exact number of FTEs for each age/sex category are exactly correct.

A number of assumptions were required in order to use the Physician Requirements Model data as input to the current effort:

- the age groups employed in the Physician Requirements Model differ from those adopted for the Integrated Requirements Model;
- the Physician Requirements Model uses three insurance categories, whereas the Integrated Requirements Model uses four;
- the Physician Requirements Model does not distinguish between urban and rural locations, while the Integrated Requirements Model does; and
- the Physician Requirements Model focuses on requirements for physicians, while the Integrated Requirements Model also incorporates non-physician practitioners.

Each of these issues is discussed in the following paragraphs.

There was not a perfect match between the age groups used in the Integrated Requirements Model and those for which utilization rates were available from the Physician Requirements Model. The Integrated Requirements Model age groups and the Physician Requirements Model age group utilization rates used to approximate the required FTEs for each, are presented in exhibit 3-15. While the age groups were not a perfect match, the relative primary care requirements of one age group relative to the others should be maintained by the approach adopted.

**Exhibit 3-15: Mapping of Physician Requirements Model
Age Group Utilization Rates into Integrated
Requirements Model Age Groups**

Integrated Requirements Model Age Groups	Physician Requirements Model Utilization Rate Age Groups
0-4 years old	0-17 years old
5-17 years old	0-17 years old
18-24 years old	18-34 years old
25-44 years old	35-54 years old
45-64 years old	55-64 years old
65-74 years old	65-74 years old
75-84 years old	75 years of age and older
85 years of age and older	75 years of age and older

The Physician Requirements Model uses three insurance settings: fee-for-service, HMO, and uninsured. The Integrated Requirements Model differs in that two different HMO settings are used. The Physician Requirements Model HMO utilization rates were used to develop both the Staff HMO and IPA HMO insurance setting FTE requirements by age and sex.

The Physician Requirements Model does not incorporate differences in requirements based on location. Therefore, it was assumed that the relative difference in primary care requirements across age and sex categories for a given insurance setting was similar between urban and rural locations.

The Physician Requirements Model focuses on physician FTEs, while the Integrated Requirements Model was developed to estimate the requirements for other primary care providers. This issue was addressed by rescaling the physician requirements estimated for

each age group so that the sum of practitioners across age groups matched the sum of practitioners across all practitioner types.

3.2.4.3 Practitioner Requirements by Age, Sex, Insurance Status, and Location

The IPF algorithm was implemented once for each location and insurance setting. The results of the IPF for urban staff model HMOs are presented in exhibit 3-16, located at the end of this subsection. Each row of the exhibit reports the results for one of the Integrated Requirements Model age/sex categories. The final row reports the total number of practitioners across all age categories. (Note that these figures match the figures presented for each practitioner type for urban staff HMOs in previous sections.) The first column indicates population sex and the second column indicates population age. The third through sixth columns report the total number of base year practitioner FTEs assigned to the given population age and sex combination — one column for each practitioner type. The seventh column is the sum of all practitioners for the age category. The eighth column presents the 1992 population by age and sex for urban staff HMOs, corresponding to exhibit 3-2 presented in subsection 3.1.1. Columns nine through twelve report the number of FTEs for each practitioner type required per 100,000 population. These numbers were obtained by dividing the number of total FTEs required by the population for each age group (and then multiplying by 100,000). The following exhibits report the corresponding figures for the other insurance setting and location combinations:

- exhibit 3-17 reports the FTE distributions and ratios for rural staff model HMOs;
- exhibit 3-18 reports the FTE distributions and ratios for urban IPA HMOs;
- exhibit 3-19 reports the FTE distributions and ratios for rural staff IPA HMOs;
- exhibit 3-20 reports the FTE distributions and ratios for the urban fee-for-service population;

- exhibit 3-21 reports the FTE distributions and ratios for the rural fee-for-service population;
- exhibit 3-22 reports the FTE distributions and ratios for the urban uninsured population; and
- exhibit 3-23 reports the FTE distributions and ratios for the rural uninsured population.

Exhibit 3-16: IPF Results for Distributing Primary Care Physician, PA, NP, and CNM FTEs by Population Age and Sex and Insurance Status — Urban Staff HMO, 1992

Population Sex	Population Sex	1992 Distribution					Total Practitioners	1992 Population	Practitioner Ratios per 100,000 Population				
		Physicians	PAs	NPs	CNMs	Total			Physicians	PAs	NPs	CNMs	Total
Male	0-4	528	40	90	0	658	618,728	85.336	6.465	14.546	0.000	106.347	
Male	5-17	1,168	90	198	0	1,456	1,369,407	85.292	6.572	14.459	0.000	106.323	
Male	18-24	197	16	34	0	247	642,107	30.680	2.492	5.295	0.000	38.467	
Male	25-44	1,043	80	176	0	1,299	2,613,667	39.906	3.061	6.734	0.000	49.700	
Male	45-64	947	72	160	0	1,179	1,559,448	60.727	4.617	10.260	0.000	75.604	
Male	65-74	256	20	44	0	320	246,925	103.675	8.100	17.819	0.000	129.594	
Male	75-84	208	16	36	0	260	150,061	138.610	10.662	23.990	0.000	173.263	
Male	85+	16	2	2	0	20	11,823	135.329	16.916	16.916	0.000	169.162	
Female	0-4	403	30	68	0	501	477,353	84.424	6.285	14.245	0.000	104.954	
Female	5-17	1,049	26	132	40	1,247	1,210,917	86.629	2.147	10.901	3.303	102.980	
Female	18-24	686	18	38	52	794	689,016	99.562	2.612	5.515	7.547	115.237	
Female	25-44	2,578	66	146	194	2,984	2,704,711	95.315	2.440	5.398	7.173	110.326	
Female	45-64	1,584	122	246	12	1,964	1,697,754	93.300	7.186	14.490	0.707	115.682	
Female	65-74	396	30	66	0	492	317,307	124.800	9.455	20.800	0.000	155.055	
Female	75-84	266	20	44	0	330	187,371	141.964	10.674	23.483	0.000	176.121	
Female	85+	73	6	12	0	91	51,730	141.117	11.599	23.197	0.000	175.913	
Total	All Ages	11,398	654	1,492	298	13,842	14,548,325	78.346	4.495	10.256	2.048	95.145	

Exhibit 3-17: IPF Results for Distributing Primary Care Physician, PA, NP, and CNM FTEs by Population Age and Sex and Insurance Status — Rural Staff HMO, 1992

Population Sex	Population Sex	1992 Distribution				Total Practitioners	1992 Population	Practitioner Ratios per 100,000 Population				
		Physicians	PAs	NPs	CNMs			Physicians	PAs	NPs	CNMs	Total
Male	0-4	13	4	2	0	19	22,225	58.493	17.998	8.999	0.000	85.489
Male	5-17	40	10	8	0	58	71,236	56.151	14.038	11.230	0.000	81.420
Male	18-24	4	0	0	0	4	17,961	22.271	0.000	0.000	0.000	22.271
Male	25-44	38	10	6	0	54	143,693	26.445	6.959	4.176	0.000	37.580
Male	45-64	30	8	6	0	44	74,076	40.499	10.800	8.100	0.000	59.399
Male	65-74	14	4	2	0	20	20,113	69.607	19.888	9.944	0.000	99.438
Male	75-84	6	2	2	0	10	6,594	90.992	30.331	30.331	0.000	151.653
Male	85+	0	0	0	0	0	0	0.000	0.000	0.000	0.000	0.000
Female	0-4	10	2	2	0	14	18,436	54.242	10.848	10.848	0.000	75.938
Female	5-17	43	4	6	2	55	70,981	60.580	5.635	8.453	2.818	77.486
Female	18-24	27	2	2	4	35	40,311	66.979	4.961	4.961	9.923	86.825
Female	25-44	80	8	4	10	102	123,256	64.906	6.491	3.245	8.113	82.755
Female	45-64	52	14	8	0	74	84,499	61.539	16.568	9.468	0.000	87.575
Female	65-74	20	6	4	0	30	24,488	81.673	24.502	16.335	0.000	122.509
Female	75-84	4	2	0	0	6	4,105	97.442	48.721	0.000	0.000	146.163
Female	85+	0	0	0	0	0	0	0.000	0.000	0.000	0.000	0.000
Total	All Ages	381	76	52	16	525	721,974	52.772	10.527	7.203	2.216	72.717

Exhibit 3-18: IPF Results for Distributing Primary Care Physician, PA, NP, and CNM FTEs by Population Age and Sex and Insurance Status — Urban IPA HMO, 1992

Population Sex	Population Sex	1992 Distribution					1992 Population	Practitioner Ratios per 100,000 Population				
		Physicians	PAs	NPs	CNMs	Total Practitioners		Physicians	PAs	NPs	CNMs	Total
Male	0-4	972	48	134	0	1,154	1,040,773	93.392	4.612	12.875	0.000	110.879
Male	5-17	2,307	116	320	0	2,743	2,470,343	93.388	4.696	12.954	0.000	111.037
Male	18-24	350	18	48	0	416	1,040,921	33.624	1.729	4.611	0.000	39.965
Male	25-44	1,977	100	274	0	2,351	4,522,216	43.718	2.211	6.059	0.000	51.988
Male	45-64	1,506	76	208	0	1,790	2,265,941	66.463	3.354	9.179	0.000	78.996
Male	65-74	294	14	40	0	348	258,669	113.659	5.412	15.464	0.000	134.535
Male	75-84	171	8	24	0	203	112,616	151.843	7.104	21.311	0.000	180.259
Male	85+	31	2	4	0	37	20,478	151.382	9.767	19.533	0.000	180.682
Female	0-4	855	44	118	0	1,017	924,060	92.527	4.762	12.770	0.000	110.058
Female	5-17	1,992	34	206	54	2,286	2,112,186	94.310	1.610	9.753	2.557	108.229
Female	18-24	1,126	18	52	60	1,256	1,039,369	108.335	1.732	5.003	5.773	120.843
Female	25-44	5,015	84	232	268	5,599	4,836,498	103.691	1.737	4.797	5.541	115.766
Female	45-64	2,478	124	314	14	2,930	2,425,418	102.168	5.113	12.946	0.577	120.804
Female	65-74	454	22	62	0	538	332,238	136.649	6.622	18.661	0.000	161.932
Female	75-84	323	16	44	0	383	208,244	155.107	7.683	21.129	0.000	183.919
Female	85+	86	4	12	0	102	55,158	155.916	7.252	21.756	0.000	184.923
Total	All Ages	19,937	728	2,092	396	23,153	23,665,128	84.246	3.076	8.840	1.673	97.836

Exhibit 3-19: IPF Results for Distributing Primary Care Physician, PA, NP, and CNM FTEs by Population Age and Sex and Insurance Status — Rural IPA HMO, 1992

Population Sex	Population Sex	1992 Distribution				Total Practitioners	1992 Population	Practitioner Ratios per 100,000 Population				
		Physicians	PAs	NPs	CNMs			Physicians	PAs	NPs	CNMs	Total
Male	0-4	972	48	134	0	1,154	1,040,773	93.392	4.612	12.875	0.000	110.879
Male	5-17	2,307	116	320	0	2,743	2,470,343	93.388	4.696	12.954	0.000	111.037
Male	18-24	350	18	48	0	416	1,040,921	33.624	1.729	4.611	0.000	39.965
Male	25-44	1,977	100	274	0	2,351	4,522,216	43.718	2.211	6.059	0.000	51.988
Male	45-64	1,506	76	208	0	1,790	2,265,941	66.463	3.354	9.179	0.000	78.996
Male	65-74	294	14	40	0	348	258,669	113.659	5.412	15.464	0.000	134.535
Male	75-84	171	8	24	0	203	112,616	151.843	7.104	21.311	0.000	180.259
Male	85+	31	2	4	0	37	20,478	151.382	9.767	19.533	0.000	180.682
Female	0-4	855	44	118	0	1,017	924,060	92.527	4.762	12.770	0.000	110.058
Female	5-17	1,992	34	206	54	2,286	2,112,186	94.310	1.610	9.753	2.557	108.229
Female	18-24	1,126	18	52	60	1,256	1,039,369	108.335	1.732	5.003	5.773	120.843
Female	25-44	5,015	84	232	268	5,599	4,836,498	103.691	1.737	4.797	5.541	115.766
Female	45-64	2,478	124	314	14	2,930	2,425,418	102.168	5.113	12.946	0.577	120.804
Female	65-74	454	22	62	0	538	332,238	136.649	6.622	18.661	0.000	161.932
Female	75-84	323	16	44	0	383	208,244	155.107	7.683	21.129	0.000	183.919
Female	85+	86	4	12	0	102	55,158	155.916	7.252	21.756	0.000	184.923
Total	All Ages	19,937	728	2,092	396	23,153	23,665,128	84.246	3.076	8.840	1.673	97.836

Exhibit 3-20: IPF Results for Distributing Primary Care Physician, PA, NP, and CNM FTEs by Population Age and Sex and Insurance Status — Urban FFS, 1992

Population Sex	Population Sex	1992 Distribution					Practitioner Ratios per 100,000 Population					
		Physicians	PAs	NPs	CNMs	Total Practitioners	1992 Population	Physicians	PAs	NPs	CNMs	Total
Male	0-4	4,947	232	552	0	5,731	5,504,920	89.865	4.214	10.027	0.000	104.107
Male	5-17	10,997	516	1,228	0	12,741	12,236,801	89.868	4.217	10.035	0.000	104.120
Male	18-24	1,693	80	190	0	1,963	5,424,576	31.210	1.475	3.503	0.000	36.187
Male	25-44	8,055	378	900	0	9,333	19,843,467	40.593	1.905	4.536	0.000	47.033
Male	45-64	7,788	364	870	0	9,022	12,658,577	61.524	2.876	6.873	0.000	71.272
Male	65-74	5,989	280	668	0	6,937	5,717,429	104.750	4.897	11.684	0.000	121.331
Male	75-84	3,828	180	428	0	4,436	2,730,607	140.189	6.592	15.674	0.000	162.455
Male	85+	895	42	100	0	1,037	638,242	140.229	6.581	15.668	0.000	162.478
Female	0-4	4,850	228	542	0	5,620	5,466,401	88.724	4.171	9.915	0.000	102.810
Female	5-17	10,779	168	902	380	12,229	12,015,098	89.712	1.398	7.507	3.163	101.780
Female	18-24	6,203	96	230	438	6,967	6,036,959	102.750	1.590	3.810	7.255	115.406
Female	25-44	20,827	326	776	1,468	23,397	21,392,515	97.357	1.524	3.627	6.862	109.370
Female	45-64	12,923	606	1,324	92	14,945	13,465,988	95.968	4.500	9.832	0.683	110.983
Female	65-74	9,459	444	1,056	0	10,959	7,362,417	128.477	6.031	14.343	0.000	148.851
Female	75-84	6,759	316	754	0	7,829	4,595,467	147.080	6.876	16.408	0.000	170.364
Female	85+	2,455	116	274	0	2,845	1,668,948	147.099	6.951	16.418	0.000	170.467
Total	All Ages	118,447	4,372	10,794	2,378	135,991	136,758,412	86.610	3.197	7.893	1.739	99.439

Exhibit 3-21: IPF Results for Distributing Primary Care Physician, PA, NP, and CNM FTEs by Population Age and Sex and Insurance Status — Rural FFS, 1992

Population Sex	Population Sex	1992 Distribution					Total Practitioners	1992 Population	Practitioner Ratios per 100,000 Population				
		Physicians	PAs	NPs	CNMs				Physicians	PAs	NPs	CNMs	Total
Male	0-4	934	152	126	0	1,212	1,488,744	62.737	10.210	8.464	0.000	81.411	
Male	5-17	2,435	398	328	0	3,161	3,879,222	62.770	10.260	8.455	0.000	81.485	
Male	18-24	346	56	46	0	448	1,588,772	21.778	3.525	2.895	0.000	28.198	
Male	25-44	1,481	242	200	0	1,923	5,225,127	28.344	4.632	3.828	0.000	36.803	
Male	45-64	1,674	274	226	0	2,174	3,895,411	42.974	7.034	5.802	0.000	55.809	
Male	65-74	1,352	220	182	0	1,754	1,848,487	73.141	11.902	9.846	0.000	94.888	
Male	75-84	975	160	132	0	1,267	995,414	97.949	16.074	13.261	0.000	127.284	
Male	85+	233	38	32	0	303	237,959	97.916	15.969	13.448	0.000	127.333	
Female	0-4	886	144	120	0	1,150	1,430,410	61.940	10.067	8.389	0.000	80.397	
Female	5-17	2,368	130	238	140	2,876	3,683,132	64.293	3.530	6.462	3.801	78.086	
Female	18-24	1,228	66	56	144	1,494	1,678,194	73.174	3.933	3.337	8.581	89.024	
Female	25-44	3,802	208	170	448	4,628	5,484,195	69.327	3.793	3.100	8.169	84.388	
Female	45-64	2,732	446	336	32	3,546	4,081,280	66.940	10.928	8.233	0.784	86.885	
Female	65-74	2,039	334	274	0	2,647	2,271,939	89.747	14.701	12.060	0.000	116.508	
Female	75-84	1,579	258	212	0	2,049	1,537,147	102.723	16.784	13.792	0.000	133.299	
Female	85+	577	94	78	0	749	561,840	102.698	16.731	13.883	0.000	133.312	
Total	All Ages	24,641	3,220	2,756	764	31,381	39,887,273	61.777	8.073	6.910	1.915	78.674	

Exhibit 3-22: IPF Results for Distributing Primary Care Physician, PA, NP, and CNM FTEs by Population Age and Sex and Insurance Status — Urban Uninsured, 1992

Population Sex	Population Sex	1992 Distribution					1992 Population	Practitioner Ratios per 100,000 Population				
		Physicians	PAs	NPs	CNMs	Total Practitioners		Physicians	PAs	NPs	CNMs	Total
Male	0-4	656	36	160	0	852	970,088	67.623	3.711	16.493	0.000	87.827
Male	5-17	1,846	100	450	0	2,396	2,728,324	67.661	3.665	16.494	0.000	87.820
Male	18-24	636	34	156	0	826	3,546,555	17.933	0.959	4.399	0.000	23.290
Male	25-44	1,424	76	348	0	1,848	6,667,741	21.357	1.140	5.219	0.000	27.716
Male	45-64	679	36	166	0	881	1,969,366	34.478	1.828	8.429	0.000	44.735
Male	65-74	0	0	0	0	0	0	0.000	0.000	0.000	0.000	0.000
Male	75-84	0	0	0	0	0	0	0.000	0.000	0.000	0.000	0.000
Male	85+	0	0	0	0	0	0	0.000	0.000	0.000	0.000	0.000
Female	0-4	614	34	150	0	798	891,466	68.875	3.814	16.826	0.000	89.516
Female	5-17	1,847	34	338	44	2,263	2,595,110	71.172	1.310	13.025	1.696	87.203
Female	18-24	1,624	30	132	76	1,862	2,504,994	64.831	1.198	5.270	3.034	74.332
Female	25-44	3,200	58	260	152	3,670	5,102,857	62.710	1.137	5.095	2.979	71.921
Female	45-64	1,364	74	304	6	1,748	2,289,720	59.571	3.232	13.277	0.262	76.341
Female	65-74	0	0	0	0	0	0	0.000	0.000	0.000	0.000	0.000
Female	75-84	0	0	0	0	0	0	0.000	0.000	0.000	0.000	0.000
Female	85+	0	0	0	0	0	0	0.000	0.000	0.000	0.000	0.000
Total	All Ages	13,890	512	2,464	278	17,144	29,266,221	47.461	1.750	8.419	0.950	58.580

Exhibit 3-23: IPF Results for Distributing Primary Care Physician, PA, NP, and CNM FTEs by Population Age and Sex and Insurance Status — Rural Uninsured, 1992

Population Sex	Population Sex	1992 Distribution					Total Practitioners	Practitioner Ratios per 100,000 Population				
		Physicians	PAs	NPs	CNMs	1992 Population		Physicians	PAs	NPs	CNMs	Total
Male	0-4	119	22	30	0	171	261,541	45.500	8.412	11.471	0.000	65.382
Male	5-17	426	82	108	0	616	937,864	45.422	8.743	11.516	0.000	65.681
Male	18-24	102	20	26	0	148	845,142	12.069	2.367	3.076	0.000	17.512
Male	25-44	238	46	60	0	344	1,661,135	14.328	2.769	3.612	0.000	20.709
Male	45-64	152	30	38	0	220	654,874	23.211	4.581	5.803	0.000	33.594
Male	65-74	0	0	0	0	0	0	0.000	0.000	0.000	0.000	0.000
Male	75-84	0	0	0	0	0	0	0.000	0.000	0.000	0.000	0.000
Male	85+	0	0	0	0	0	0	0.000	0.000	0.000	0.000	0.000
Female	0-4	118	22	30	0	170	255,413	46.200	8.614	11.746	0.000	66.559
Female	5-17	429	28	82	16	555	867,203	49.469	3.229	9.456	1.845	63.999
Female	18-24	266	18	22	18	324	593,035	44.854	3.035	3.710	3.035	54.634
Female	25-44	573	36	48	40	697	1,321,257	43.368	2.725	3.633	3.027	52.753
Female	45-64	287	56	66	2	411	719,157	39.908	7.787	9.177	0.278	57.150
Female	65-74	0	0	0	0	0	0	0.000	0.000	0.000	0.000	0.000
Female	75-84	0	0	0	0	0	0	0.000	0.000	0.000	0.000	0.000
Female	85+	0	0	0	0	0	0	0.000	0.000	0.000	0.000	0.000
Total	All Ages	2,710	360	510	76	3,656	8,116,621	33.388	4.435	6.283	0.936	45.043

3.3 ADJUSTMENT OF STAFFING MODELS TO 1995

As noted earlier, there were insufficient 1995 data available to implement the methodology just described in the development of the 1992 staffing models. Thus the 1995 staffing models are estimated by a series of adjustment factors applied to the 1992 staffing models. These factors are designed so that the 1995 staffing models, when applied to their counterpart 1995 populations, result in requirements estimates that are identical to best estimates of the numbers of primary care practitioners actually providing patient care in 1995.

The approach to adjustment factor development consists of the following two steps:

- 1995 initial requirements estimates are generated by applying the 1992 staffing models to the 1995 populations; and
- the adjustment factor is computed as the ratio of the 1995 “actual” practitioner number to the initial requirement estimated in the first step above.

All elements of all 1995 staffing models are then multiplied by the appropriate adjustment factor.

Exhibit 3-24 displays, for each practitioner type, the initial 1995 requirements estimate, the actual 1995 number, and the resulting adjustment factor. The 1995 “actual” numbers are really best estimates based upon available data and holding with the definitions adopted in the corresponding 1992 figures.

**Exhibit 3-24: Computation of 1995 Staffing Model
Adjustment Factors**

	1995 Initial Estimate	1995 Actual	Adjustment Factor
Physicians	199,856	200,405	1.003
PAs	10,572	11,960	1.13
NPs	23,210	25,300	1.09
CNMs	4,155	4,155	1.00

The number of physicians includes MDs and DOs in the primary care specialties (including OB/GYN) who are providing patient care and are located in the United States (those in US possessions are excluded). The MD component was estimated based on trends developed from the 1991 through 1994 editions of the *AMA Physician Characteristics and Distribution (PCD)* book. The DO component was derived from the 1992 AOA number cited earlier. It appears likely that the DO component is overstated due to difficulties in measuring the number who are inactive. Estimates of numbers of PAs, NPs, and CNMs were kept consistent with the 1992 definitions and were provided by BHP staff.

4.0 MODEL SCENARIOS

This chapter provides results from six scenarios analyzed using the model. These scenarios are designed to provide estimates of how practitioner requirements are affected by:

- population growth and aging;
- expected increases in managed care penetration;
- higher than expected increases in managed care penetration;
- universal coverage;
- equal minority access to primary care; and
- a doubling of the use of PAs, NPs, and CNMs.

For each scenario, the impact on practitioner requirements is computed for the year 2005 and then compared to the estimated supply in 1995.

4.1 THE STATUS QUO SCENARIO

The status quo scenario holds age-/sex-specific insurance distributions and staffing models at their 1995 estimated values. Thus, any changes in requirements between 1995 and 2005 are attributable to the estimated growth and aging of the population.

Exhibit 4-1 presents selected information on population growth and the resulting impact on practitioner requirements. For all but CNMs, practitioner requirements are projected to grow somewhat faster than the overall population. This is due to the fact that the population is aging as well as growing and, in general, an older population will use more primary care per capita.

**Exhibit 4-1: Status Quo Scenario Populations (000)
and Practitioner Requirements**

	1995	2005	% Change
US Population	263,434	288,286	9.4%
Ages 25-44, Female	42,073	40,194	-4.5%
Ages 0-4	20,181	19,333	-4.2%
Ages 65+	33,649	36,970	9.9%
PCPs	200,405	221,306	10.4%
PAs	11,960	13,319	11.4%
NPs	25,300	28,423	12.3%
CNMs	4,155	4,231	1.8%

The small growth in CNM requirements is due to the lack of growth in the female population of child bearing age. As the exhibit shows, there is actually a decline projected in numbers of females aged 25 to 44.

In summary, the status quo scenario shows that, in the absence of changes in insurance distributions and staffing models:

- primary care physician (PCP), PA, and NP requirements grow slightly faster than the overall population; and
- CNM requirements show almost no growth.

More detailed results from this scenario are provided at the end of the chapter.

4.2 THE BASELINE INSURANCE PROJECTION SCENARIO

This scenario differs from the status quo scenario in that insurance distributions are modified to reflect best estimates of HMO penetration and changes in the uninsured population. Discussion of how these estimates were derived was provided in chapter 3.

As shown in exhibit 4-2, total HMO penetration is expected to grow from 22.8% to 42.4% from 1995 to 2005, with the largest growth in the IPA HMO model. Fee-for-service percentages decline significantly and there is a small decrease in the percent uninsured.

Exhibit 4-2: Baseline Insurance Projection Scenario Insurance Distributions and Practitioner Requirements

	1995	2005	% Change
Staff HMO	7.7%	11.6%	50.6%
IPA HMO	15.1%	30.8%	104.0%
Fee-for-Service	62.0%	42.7%	-31.1%
Uninsured	15.2%	14.9%	-2.0%
PCPs	200,405	223,403	11.5%
PAs	11,960	13,768	15.1%
NPs	25,300	29,191	15.4%
CNMs	4,155	4,145	-0.2%

This expansion in managed care results in a small additional increase in physician requirements as compared to the status quo scenario and somewhat larger increases in PA and NP requirements. CNM requirements are actually reduced slightly relative to the status quo. More detailed results from this scenario are provided at the end of the chapter.

4.3 THE HIGH MANAGED CARE SCENARIO

Discussion of the high managed care scenario is divided into two sections. The first section describes the basis for the HMO penetration rate estimates and the second section discusses the impact on practitioner requirements.

4.3.1 Scenario Development and Assumptions

The high managed care scenario is intended to capture an upper-bound expectation of HMO penetration by the year 2005. The underlying assumptions are consistent with Medicare actively promoting HMO enrollment among its beneficiaries and states shifting most of their Medicaid populations into HMOs.

Under the high managed care scenario, the overall HMO penetration is assumed to increase to 60%. This scenario assumes that HMO penetration in the private sector reaches 77% (compared to 60% in the baseline scenario), while Medicaid and Medicare HMO penetration increase more dramatically — the Medicaid HMO penetration rate more than doubles compared to the baseline (67% compared to 29%) and Medicare penetration rate nearly triples (43% compared to 15%).

In 1994, only two states, Arizona and Oregon, had placed all of their Medicaid population under managed care for at least the acute care portion. Oregon had enrolled all but those with disabilities and those in institutions for a Medicaid penetration rate of 70.2% (HCFA, 1995). The Medicare population is assumed to embrace HMOs to a greater degree than in the baseline scenario, but it is assumed that many of the elderly prefer to maintain their ability to choose their physicians by remaining in a fee-for-service setting. This assumption is based on the finding that even among the top 1% of counties with the highest Medicare HMO penetration rates, the penetration rate was approximately 30%, implying that even in highly saturated Medicare HMO areas, many beneficiaries chose not to enroll in HMOs (HCFA, 1995).

In general, it is assumed higher proportions would enroll in individual practitioner plans (IPA) as opposed to group/staff plans for all payment categories. This is consistent with historical enrollment patterns (GHAA, 1994).

For the Medicaid population, it is assumed that over half of those moving from fee-for-service to HMOs would be enrolled in group/staff HMOs. This assumption is based on the perceived willingness of states to limit provider choice among Medicaid beneficiaries to ensure potential savings from managed care.

Finally, it is assumed that higher percentages of individuals residing in urban areas would enroll in HMOs than those in rural, and that higher percentages would enroll in

IPAs in rural areas than in urban areas. This assumption is based on both current patterns of enrollment and the need for a minimum population level to support group/staff models.

4.3.2 Scenario Results

Results from the high managed care scenario are shown in exhibit 4-3. The additional growth in managed care relative to the baseline projection scenario causes a small increase in physician requirements, some negligible decline in CNM requirements, and further growth in PA and NP requirements.

Exhibit 4-3: High Managed Care Scenario Insurance Distributions and Practitioner Requirements

	1995	2005	% Change
Staff HMO	7.7%	18.1%	135.1%
IPA HMO	15.1%	42.3%	180.1%
Fee-for-Service	62.0%	24.5%	-60.5%
Uninsured	15.2%	15.1%	-0.7%
PCPs	200,405	224,639	12.1%
PAs	11,960	14,429	20.6%
NPs	25,300	30,148	19.2%
CNMs	4,155	4,097	-1.4%

Under the high managed care scenario, the 12.1% growth in physician requirements from 1995 to 2005 is still only moderately above the 9.4% growth in population. However, PAs and NPs grow at slightly over twice the population growth rate while CNMs show no growth. As with the other scenarios, detailed results are provided at the end of this chapter.

4.4 THE UNIVERSAL COVERAGE SCENARIO

This scenario is an extension of the high managed care scenario in which all of the uninsured are distributed across the insured categories. Scenario development and assumptions are discussed first, followed by results.

4.4.1 Scenario Development and Assumptions

Under the universal coverage scenario, some form of government intervention is assumed to guarantee health insurance coverage for the uninsured. This scenario also assumes that HMO penetration rates reach the levels found in the high managed care scenario. Those individuals who would have been uninsured in the baseline scenario are assumed to enroll in plans based on the same distribution as the privately insured under the high managed care scenario. This assumption is consistent with past Lewin-VHI efforts to model the enrollment patterns of the uninsured.

In addition to providing coverage for the uninsured and increasing HMO penetration rates over the baseline scenario, this scenario also assumes greater coverage for primary and preventive care relative to the baseline. It is assumed that demand for primary care would increase by nearly 10% among persons enrolled in fee-for-service plans due to increased coverage of preventive care services. This assumption is based on two factors. First, coverage for preventive care services among fee-for-service plans is considerably lower than managed care plans. HIAA data on the 1989 percentage of employer health plans that provide coverage for selected preventive services was generally over 90% among managed care plans, while fee-for-service plans covered these services between 34% to 67% of the time (see exhibit 4-4). Second, the assumed increase in demand of 10% is based in part on Jonathan Weiner's assumptions (1994). In his simulations, Weiner assumed that 75% of the uninsured would have at least some preventive coverage, up from 35%, resulting in a 5% increase in physician contacts. In this universal coverage scenario,

it was assumed that all individuals in fee-for-service would have increased levels of preventive care coverage, implying an 8%-10% in demand.¹

Exhibit 4-4: Coverage for Selected Preventive Care Services in Employer Health Plans

Type of Plan	Adult Physical	Well-Baby	Preventive Diagnostic
Conventional	34%	50%	67%
PPO	42%	62%	71%
IPA	95%	98%	94%
Staff/Group	99%	99%	100%
Hybrid	85%	95%	98%

To show this increase in demand, fee-for-service staffing models were adjusted such that physician ratios were raised by 8%, PA and NP ratios by 10%, and CNM ratios by 2%, reflecting rough expectations as to which practitioners would provide the increased preventive care.

4.4.2 Scenario Results

As shown in exhibit 4-5, universal coverage results in significantly greater requirements for physicians, PAs, and CNMs. Relative to 1995 levels, physician requirements now grow by 20.3%, PAs by 30.7%, and CNMs by 9.5%. This is not surprising because staffing ratios for insured populations are much greater than for uninsured populations for these practitioner types.

¹ Weiner assumed a 5% increase for a 40 percentage point increase (35% to 75%) in the proportion of persons with primary care coverage. In the universal coverage scenario, a 66% increase was assumed (34% of those with adult physical coverage in conventional plans shifting to 100%) which if the same relationship is used results in an 8.3% increase ($5/40 = 0.125$; $0.125 * 66 = 0.083$).

Exhibit 4-5: Universal Coverage Scenario Insurance Distributions and Practitioner Requirements

	1995	2005	% Change
Staff HMO	7.7%	21.4%	177.9%
IPA HMO	15.1%	50.4%	233.8%
Fee-for-Service	62.0%	28.2%	-54.5%
Uninsured	15.2%	0%	-100.0%
PCPs	200,405	241,170	20.3%
PAs	11,960	15,634	30.7%
NPs	25,300	30,656	21.2%
CNMs	4,155	4,550	9.5%

NP requirements are not greatly affected by universal coverage because NP staffing ratios are quite high for uninsured populations. Under the universal coverage scenario, NP requirements are 21.2% above 1995 levels — a figure that is not very different from the results of the high managed care scenario. Detailed results are provided at the end of the chapter.

4.5 EQUAL ACCESS UNDER UNIVERSAL COVERAGE SCENARIO

Even under universal coverage, there remain barriers to receiving care that result in unequal access for certain populations. The decision to seek needed care depends not only upon ability to pay, but also upon knowledge and attitudes regarding the health care system and the providers that are locally available. These educational and attitudinal barriers can result in pockets of underserved populations, irrespective of insurance coverage. Such barriers can be reduced through a concerted effort at education and attitudinal change, combined with the development of a local health care system that is attractive and familiar to the targeted population.

This scenario examines practitioner requirements under a scenario which combines universal coverage with a program aimed at eliminating these other barriers to access. Some background on the scenario development and assumptions is presented first, followed by scenario results.

4.5.1 Scenario Development and Assumptions

The identification of populations that would remain underserved, even under universal coverage, is a significant undertaking and could not be addressed in depth as a part of this project. To determine a rough approximation, data from the 1992 National Health Interview Survey (NHIS) were examined for what they reveal about differences in access to primary care across population subgroups defined according to race and ethnicity.

Results indicate that whites had approximately 13% more primary care visits per capita than non-whites, controlling for other relevant factors such as age, sex, and insurance status. This percentage does not vary significantly within setting (i.e., fee-for-service, group/staff HMOs, and IPA HMOs) or by income level. Ethnicity was also investigated as an indicator of access barriers, but was rejected for use in this study.

This scenario assumes that steps would be taken to eliminate barriers to access such that these racial differences in utilization rates would be eliminated. This means increasing primary care utilization by about 13% for the non-white population. Since about 15% of the population is non-white, the net result is an approximate 2% increase in total primary care visits. This is represented in the model through a 2% increase in each of the staffing models.

4.5.2 Scenario Results

Scenario results are presented in exhibit 4-6. As expected based upon the construction of the scenario, practitioner requirements grow by 2% relative to the universal coverage scenario without equal access. The results show this same 2% growth for all practitioner types and delivery settings. With additional research, it would be possible to refine this scenario to develop differential impacts by practitioner type and delivery setting.

**Exhibit 4-6: Equal Access Under Universal Coverage Scenario
Insurance Distributions and Practitioner Requirements**

	1995	2005	% Change
Staff HMO	7.7%	21.4%	177.9%
IPA HMO	15.1%	50.4%	233.8%
Fee-for-Service	62.0%	28.2%	-54.5%
Uninsured	15.2%	0%	-100.0%
PCPs	200,405	245,993	22.7%
PAs	11,960	15,946	33.3%
NPs	25,300	31,269	23.6%
CNMs	4,155	4,641	11.7%

4.6 THE HIGH PA/NP/CNM USE SCENARIO

This scenario is hypothetical, but is a useful demonstration of IRM capabilities and could become quite relevant if market forces lead to increased PA/NP/CNM productivity and use. Note that there is nothing unusual about the insurance distributions in this scenario. They are set to the baseline projections represented best estimates for 2005.

In constructing this scenario, it was first necessary to make an assumption about the current productivity levels of PAs, NPs, and CNMs as compared to physicians. The literature suggests that these productivity levels vary according to state regulations, physician delegatory styles, and skill levels. While there is anecdotal evidence of instances where productivity ratios approach one, ranges reported in the literature tend to range between .2 and .6. For this scenario, a starting productivity ratio of .4 is assumed. This would appear to be a conservative estimate, given that PA and NP salaries are currently about 40% of non-OB/GYN physician incomes. It is also in the middle of the ranges cited in the literature.

Under this scenario, it is hypothesized (somewhat arbitrarily) that PA/NP/CNM productivity increases by 25%, with physician productivity held constant. Thus, the productivity ratio increases from .4 to .5. Holding PAs, NPs, and CNMs constant, this reduces physician requirements, assuming no change in availability of services. Next, PAs, NPs, and CNMs are doubled with physicians, again, reduced to hold availability of services constant.

Results are presented in exhibit 4-7. The combination of population growth, increased managed care penetration, and doubled staffing ratios leads to an increase of over 130% in PAs and NPs. For CNMs, the growth in population and managed care caused no increase, so the doubled staffing ratios simply double the requirements — a 100% increase. Physician requirements are reduced to slightly below 1995 levels. As with the preceding scenarios, detailed results are presented at the end of this chapter.

Exhibit 4-7: High PA, NP, CNM Use Scenario Insurance Distributions and Practitioner Requirements

	1995	2005	% Change
Staff HMO	7.7%	11.6%	50.6%
IPA HMO	15.1%	30.8%	104.0%
Fee-for-Service	62.0%	42.7%	-31.1%
Uninsured	15.2%	14.9%	-2.0%
PCPs	200,405	195,208	-2.6%
PAs	11,960	27,503	130.0%
NPs	25,300	58,286	130.4%
CNMs	4,155	8,283	99.4%

Integrated Requirements Model Population By Insurance Category Report

18-Sep-95
08:56

Scenario Year: 1995

Scenario Name: Status Quo

Scenario Description: For years 1995 to 2020 insurance distributions and staffing models are set to 1995 estimated values.

Under 65	Urban		Rural		Total	
Staff Model HMO						
Medicaid	1,217,761	.7%	0	.0%	1,217,761	.5%
Other	17,042,076	9.2%	904,459	2.1%	17,946,535	7.8%
IPA Model HMO						
Medicaid	1,695,956	.9%	245,776	.6%	1,941,732	.8%
Other	33,182,385	17.9%	2,928,599	6.7%	36,110,984	15.7%
Fee For Service						
Medicaid	13,139,449	7.1%	3,908,978	8.9%	17,048,427	7.4%
Other	88,325,922	47.5%	27,158,438	61.7%	115,484,360	50.3%
Uninsured	31,194,694	16.8%	8,840,759	20.1%	40,035,453	17.4%
Total	185,798,243	100.0%	43,987,009	100.0%	229,785,252	100.0%
65 and older	Urban		Rural		Total	
Medicare Staff Model HMO	1,118,536	4.3%	62,937	.8%	1,181,474	3.5%
Medicare IPA Model HMO	1,559,609	6.0%	173,839	2.2%	1,733,448	5.2%
Medicare Fee For Service	23,144,525	89.6%	7,589,066	97.0%	30,733,592	91.3%
Total	25,822,671	100.0%	7,825,843	100.0%	33,648,514	100.0%
All Ages	Urban		Rural		Total	
Staff Model HMO	19,378,373	9.2%	967,397	1.9%	20,345,770	7.7%
IPA Model HMO	36,437,950	17.2%	3,348,214	6.5%	39,786,164	15.1%
Fee For Service	124,609,897	58.9%	38,656,482	74.6%	163,266,379	62.0%
Uninsured	31,194,694	14.7%	8,840,759	17.1%	40,035,453	15.2%
Total	211,620,914	100.0%	51,812,852	100.0%	263,433,766	100.0%

Insurance Assignments:

Urban/Under65: 1995 Baseline Projection, Urban, < 65
 Urban/65+: 1995 Baseline Projection, Urban, 65+
 Rural/Under65: 1995 Baseline Projection, Rural, < 65
 Rural/65+: 1995 Baseline Projection, Rural, 65+

Integrated Requirements Model Practitioners per 100,000 Report

18-Sep-95
08:56

Scenario Year: 1995

Scenario Name: Status Quo

Scenario Description: For years 1995 to 2020 insurance distributions and staffing models are set to 1995 estimated values.

Staff Model HMO	Urban	Rural	Total
Physicians	78.5	52.8	77.3
Physician Assistants	5.1	11.8	5.4
Nurse Practitioners	11.2	7.8	11.0
Certified Nurse Midwives	2.0	2.2	2.0
Total	96.8	74.6	95.8
IPA Model HMO	Urban	Rural	Total
Physicians	85.0	62.0	83.1
Physician Assistants	3.5	8.9	4.0
Nurse Practitioners	9.8	7.7	9.6
Certified Nurse Midwives	1.6	2.2	1.7
Total	100.0	80.7	98.4
Fee For Service	Urban	Rural	Total
Physicians	87.9	62.3	81.8
Physician Assistants	3.7	9.3	5.0
Nurse Practitioners	10.2	7.6	9.6
Certified Nurse Midwives	1.6	1.9	1.6
Total	103.4	81.0	98.1
Uninsured	Urban	Rural	Total
Physicians	48.1	33.8	45.0
Physician Assistants	2.0	5.1	2.7
Nurse Practitioners	9.3	6.9	8.8
Certified Nurse Midwives	0.9	0.9	0.9
Total	60.4	46.7	57.4
All Insurances	Urban	Rural	Total
Physicians	80.7	57.2	76.1
Physician Assistants	3.6	8.6	4.5
Nurse Practitioners	10.1	7.5	9.6
Certified Nurse Midwives	1.5	1.7	1.6
Grand Total	95.9	75.0	91.8

Staffing Model Assignments:

Urban/Staff HMO: 1995 Estimated, Urban, Staff
 Rural/Staff HMO: 1995 Estimated, Rural, Staff
 Urban/IPA HMO: 1995 Estimated, Urban, IPA
 Rural/IPA HMO: 1995 Estimated, Rural, IPA
 Urban/FFS: 1995 Estimated, Urban, FFS
 Rural/FFS: 1995 Estimated, Rural, FFS
 Urban/Uninsured: 1995 Estimated, Urban, Uninsured
 Rural/Uninsured: 1995 Estimated, Rural, Uninsured

Integrated Requirements Model Primary Care Practitioner Requirements Report

18-Sep-95
08:56

Scenario Year: 1995

Scenario Name: Status Quo

Scenario Description: For years 1995 to 2020 insurance distributions and staffing models are set to 1995 estimated values.

Requirements	Urban	Rural	Total	1995 Actual	% Change
Physicians	170,752	29,653	200,405	200,405	.0%
Physician Assistants	7,520	4,440	11,960	11,960	.0%
Nurse Practitioners	21,404	3,895	25,300	25,300	.0%
Certified Nurse Midwives	3,260	895	4,155	4,155	.0%
Total	202,935	38,885	241,820	241,820	.0%

Compensation (\$ millions)	Urban	Rural	Total	1995 Actual	% Change
Physicians	\$26,501.2	\$4,602.3	\$31,103.5	\$31,103.5	.0%
Physician Assistants	\$422.8	\$249.7	\$672.5	\$672.5	.0%
Nurse Practitioners	\$1,112.8	\$202.5	\$1,315.3	\$1,315.3	.0%
Certified Nurse Midwives	\$191.4	\$52.6	\$244.0	\$244.0	.0%
Total	\$28,228.2	\$5,107.1	\$33,335.3	\$33,335.3	.0%

Scenario Assignments:

Practitioner Compensation Assignment:
1995 Compensation Levels

Insurance Assignments:

Urban/Under65: 1995 Baseline Projection, Urban, < 65
 Urban/65+: 1995 Baseline Projection, Urban, 65+
 Rural/Under65: 1995 Baseline Projection, Rural, < 65
 Rural/65+: 1995 Baseline Projection, Rural, 65+

Staffing Model Assignments:

Urban/Staff HMO: 1995 Estimated, Urban, Staff
 Rural/Staff HMO: 1995 Estimated, Rural, Staff
 Urban/IPA HMO: 1995 Estimated, Urban, IPA
 Rural/IPA HMO: 1995 Estimated, Rural, IPA
 Urban/FFS: 1995 Estimated, Urban, FFS
 Rural/FFS: 1995 Estimated, Rural, FFS
 Urban/Uninsured: 1995 Estimated, Urban, Uninsured
 Rural/Uninsured: 1995 Estimated, Rural, Uninsured

Integrated Requirements Model Population By Insurance Category Report

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Scenario Year: 2005

Scenario Name: Status Quo

Scenario Description: For years 1995 to 2020 insurance distributions and staffing models are set to 1995 estimated values.

Under 65	Urban		Rural		Total	
Staff Model HMO						
Medicaid	1,346,464	7%	0	0%	1,346,464	5%
Other	18,843,215	9.2%	943,406	2.1%	19,786,621	7.9%
IPA Model HMO						
Medicaid	1,875,198	9%	256,359	.6%	2,131,557	8%
Other	36,689,357	17.9%	3,054,708	6.7%	39,744,065	15.8%
Fee For Service						
Medicaid	14,528,129	7.1%	4,077,302	8.9%	18,605,431	7.4%
Other	97,660,893	47.5%	28,327,909	61.7%	125,988,801	50.1%
Uninsured	34,491,592	16.8%	9,221,451	20.1%	43,713,043	17.4%
Total	205,434,847	100.0%	45,881,135	100.0%	251,315,982	100.0%
65 and older						
Medicare Staff Model HMO	1,243,810	4.3%	66,389	.8%	1,310,199	3.5%
Medicare IPA Model HMO	1,734,282	6.0%	183,372	2.2%	1,917,654	5.2%
Medicare Fee For Service	25,736,660	89.6%	8,005,232	97.0%	33,741,892	91.3%
Total	28,714,752	100.0%	8,254,993	100.0%	36,969,745	100.0%
All Ages						
Staff Model HMO	21,433,488	9.2%	1,009,795	1.9%	22,443,283	7.8%
IPA Model HMO	40,298,837	17.2%	3,494,439	6.5%	43,793,276	15.2%
Fee For Service	137,925,681	58.9%	40,410,443	74.6%	178,336,124	61.9%
Uninsured	34,491,592	14.7%	9,221,451	17.0%	43,713,043	15.2%
Total	234,149,599	100.0%	54,136,128	100.0%	288,285,727	100.0%

Insurance Assignments:

Urban/Under65: 1995 Baseline Projection, Urban, < 65
 Urban/65+: 1995 Baseline Projection, Urban, 65+
 Rural/Under65: 1995 Baseline Projection, Rural, < 65
 Rural/65+: 1995 Baseline Projection, Rural, 65+

Integrated Requirements Model Practitioners per 100,000 Report

18-Sep-95
08:57

Scenario Year: 2005

Scenario Name: Status Quo

Scenario Description: For years 1995 to 2020 insurance distributions and staffing models are set to 1995 estimated values.

Staff Model HMO	Urban	Rural	Total
Physicians	79.0	53.1	77.8
Physician Assistants	5.3	12.2	5.6
Nurse Practitioners	11.5	8.1	11.4
Certified Nurse Midwives	1.9	2.0	1.9
Total	97.6	75.4	96.6
IPA Model HMO	Urban	Rural	Total
Physicians	85.5	62.2	83.7
Physician Assistants	3.6	9.2	4.1
Nurse Practitioners	10.0	7.9	9.9
Certified Nurse Midwives	1.5	2.0	1.6
Total	100.7	81.3	99.2
Fee For Service	Urban	Rural	Total
Physicians	88.5	62.7	82.6
Physician Assistants	3.8	9.5	5.1
Nurse Practitioners	10.5	7.8	9.9
Certified Nurse Midwives	1.5	1.7	1.5
Total	104.2	81.7	99.1
Uninsured	Urban	Rural	Total
Physicians	48.4	33.8	45.4
Physician Assistants	2.1	5.2	2.7
Nurse Practitioners	9.6	7.1	9.0
Certified Nurse Midwives	0.9	0.9	0.9
Total	61.0	47.0	58.0
All Insurances	Urban	Rural	Total
Physicians	81.2	57.5	76.8
Physician Assistants	3.7	8.8	4.6
Nurse Practitioners	10.4	7.7	9.9
Certified Nurse Midwives	1.4	1.6	1.5
Grand Total	96.7	75.6	92.7

Staffing Model Assignments:

Urban/Staff HMO: 1995 Estimated, Urban, Staff
 Rural/Staff HMO: 1995 Estimated, Rural, Staff
 Urban/IPA HMO: 1995 Estimated, Urban, IPA
 Rural/IPA HMO: 1995 Estimated, Rural, IPA
 Urban/FFS: 1995 Estimated, Urban, FFS
 Rural/FFS: 1995 Estimated, Rural, FFS
 Urban/Uninsured: 1995 Estimated, Urban, Uninsured
 Rural/Uninsured: 1995 Estimated, Rural, Uninsured

Integrated Requirements Model

Primary Care Practitioner Requirements Report

18-Sep-95
08:57

Scenario Year: 2005

Scenario Name: Status Quo

Scenario Description: For years 1995 to 2020 insurance distributions and staffing models are set to 1995 estimated values.

<u>Requirements</u>	<u>Urban</u>	<u>Rural</u>	<u>Total</u>	<u>1995 Actual</u>	<u>% Change</u>
Physicians	190,156	31,151	221,306	200,405	10.4%
Physician Assistants	8,554	4,765	13,319	11,960	11.4%
Nurse Practitioners	24,264	4,159	28,423	25,300	12.3%
Certified Nurse Midwives	3,365	866	4,231	4,155	1.8%
Total	226,338	40,941	267,279	241,820	10.5%

<u>Compensation (\$ millions)</u>	<u>Urban</u>	<u>Rural</u>	<u>Total</u>	<u>1995 Actual</u>	<u>% Change</u>
Physicians	\$29,512.7	\$4,834.7	\$34,347.4	\$31,103.5	10.4%
Physician Assistants	\$481.0	\$268.0	\$748.9	\$672.5	11.4%
Nurse Practitioners	\$1,261.4	\$216.2	\$1,477.7	\$1,315.3	12.3%
Certified Nurse Midwives	\$197.6	\$50.9	\$248.4	\$244.0	1.8%
Total	\$31,452.7	\$5,369.7	\$36,822.4	\$33,335.3	10.5%

Scenario Assignments:

Practitioner Compensation Assignment:
1995 Compensation Levels

Insurance Assignments:

Urban/Under65: 1995 Baseline Projection, Urban, < 65
 Urban/65+: 1995 Baseline Projection, Urban, 65+
 Rural/Under65: 1995 Baseline Projection, Rural, < 65
 Rural/65+: 1995 Baseline Projection, Rural, 65+

Staffing Model Assignments:

Urban/Staff HMO: 1995 Estimated, Urban, Staff
 Rural/Staff HMO: 1995 Estimated, Rural, Staff
 Urban/IPA HMO: 1995 Estimated, Urban, IPA
 Rural/IPA HMO: 1995 Estimated, Rural, IPA
 Urban/FFS: 1995 Estimated, Urban, FFS
 Rural/FFS: 1995 Estimated, Rural, FFS
 Urban/Uninsured: 1995 Estimated, Urban, Uninsured
 Rural/Uninsured: 1995 Estimated, Rural, Uninsured

Integrated Requirements Model Population By Insurance Category Report

18-Sep-95
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Scenario Year: 2005

Scenario Name: Baseline Insurance Projection

Scenario Description: For years 1995 to 2020 insurance distributions are set to best estimates and staffing models are set to 1995 estimated values.

Under 65	Urban		Rural		Total	
Staff Model HMO						
Medicaid	1,955,046	1.0%	0	.0%	1,955,046	.8%
Other	28,122,580	13.7%	1,393,946	3.0%	29,516,526	11.7%
IPA Model HMO						
Medicaid	3,708,415	1.8%	511,113	1.1%	4,219,528	1.7%
Other	74,335,923	36.2%	6,255,182	13.6%	80,591,105	32.1%
Fee For Service						
Medicaid	11,565,936	5.6%	3,656,290	8.0%	15,222,226	6.1%
Other	51,834,391	25.2%	25,009,658	54.5%	76,844,049	30.6%
Uninsured	33,912,556	16.5%	9,054,947	19.7%	42,967,503	17.1%
Total	205,434,847	100.0%	45,881,135	100.0%	251,315,982	100.0%
65 and older	Urban		Rural		Total	
Medicare Staff Model HMO	1,832,313	6.4%	92,588	1.1%	1,924,901	5.2%
Medicare IPA Model HMO	3,498,630	12.2%	374,868	4.5%	3,873,498	10.5%
Medicare Fee For Service	23,383,809	81.4%	7,787,537	94.3%	31,171,346	84.3%
Total	28,714,752	100.0%	8,254,993	100.0%	36,969,745	100.0%
All Ages	Urban		Rural		Total	
Staff Model HMO	31,909,939	13.6%	1,486,533	2.7%	33,396,472	11.6%
IPA Model HMO	81,542,969	34.8%	7,141,163	13.2%	88,684,132	30.8%
Fee For Service	86,784,136	37.1%	36,453,485	67.3%	123,237,620	42.7%
Uninsured	33,912,556	14.5%	9,054,947	16.7%	42,967,503	14.9%
Total	234,149,599	100.0%	54,136,128	100.0%	288,285,727	100.0%

Insurance Assignments:

Urban/Under65: 2005 Baseline Projection, Urban, < 65
 Urban/65+: 2005 Baseline Projection, Urban, 65+
 Rural/Under65: 2005 Baseline Projection, Rural, < 65
 Rural/65+: 2005 Baseline Projection, Rural, 65+

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Integrated Requirements Model Practitioners per 100,000 Report

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Scenario Year: 2005

Scenario Name: Baseline Insurance Projection

Scenario Description: For years 1995 to 2020 insurance distributions are set to best estimates and staffing models are set to 1995 estimated values.

Staff Model HMO	Urban	Rural	Total
Physicians	78.9	53.0	77.7
Physician Assistants	5.3	12.1	5.6
Nurse Practitioners	11.5	8.1	11.4
Certified Nurse Midwives	1.9	2.0	1.9
Total	97.5	75.2	96.5
IPA Model HMO	Urban	Rural	Total
Physicians	85.4	62.2	83.6
Physician Assistants	3.6	9.2	4.1
Nurse Practitioners	10.1	7.9	9.9
Certified Nurse Midwives	1.5	2.0	1.6
Total	100.7	81.2	99.1
Fee For Service	Urban	Rural	Total
Physicians	93.2	63.2	84.3
Physician Assistants	4.1	9.7	5.8
Nurse Practitioners	11.3	7.9	10.3
Certified Nurse Midwives	1.3	1.7	1.4
Total	110.0	82.5	101.8
Uninsured	Urban	Rural	Total
Physicians	48.3	33.8	45.3
Physician Assistants	2.1	5.2	2.7
Nurse Practitioners	9.6	7.1	9.0
Certified Nurse Midwives	0.9	0.9	0.9
Total	60.9	47.0	57.9
All Insurances	Urban	Rural	Total
Physicians	82.0	57.9	77.5
Physician Assistants	3.8	8.9	4.8
Nurse Practitioners	10.7	7.8	10.1
Certified Nurse Midwives	1.4	1.6	1.4
Grand Total	97.9	76.2	93.8

Staffing Model Assignments:

Urban/Staff HMO: 1995 Estimated, Urban, Staff
 Rural/Staff HMO: 1995 Estimated, Rural, Staff
 Urban/IPA HMO: 1995 Estimated, Urban, IPA
 Rural/IPA HMO: 1995 Estimated, Rural, IPA
 Urban/FFS: 1995 Estimated, Urban, FFS
 Rural/FFS: 1995 Estimated, Rural, FFS
 Urban/Uninsured: 1995 Estimated, Urban, Uninsured
 Rural/Uninsured: 1995 Estimated, Rural, Uninsured

Integrated Requirements Model

Primary Care Practitioner Requirements Report

18-Sep-95
08:57

Scenario Year: 2005

Scenario Name: Baseline Insurance Projection

Scenario Description: For years 1995 to 2020 insurance distributions are set to best estimates and staffing models are set to 1995 estimated values.

<u>Requirements</u>	<u>Urban</u>	<u>Rural</u>	<u>Total</u>	1995	<u>% Change</u>
				<u>Actual</u>	
Physicians	192,066	31,337	223,403	200,405	11.5%
Physician Assistants	8,941	4,827	13,768	11,960	15.1%
Nurse Practitioners	24,983	4,208	29,191	25,300	15.4%
Certified Nurse Midwives	3,282	863	4,145	4,155	-3%
Total	229,272	41,235	270,507	241,820	11.9%

<u>Compensation (\$ millions)</u>	<u>Urban</u>	<u>Rural</u>	<u>Total</u>	1995	<u>% Change</u>
				<u>Actual</u>	
Physicians	\$29,809.2	\$4,863.6	\$34,672.8	\$31,103.5	11.5%
Physician Assistants	\$502.8	\$271.4	\$774.2	\$672.5	15.1%
Nurse Practitioners	\$1,298.8	\$218.8	\$1,517.6	\$1,315.3	15.4%
Certified Nurse Midwives	\$192.7	\$50.7	\$243.4	\$244.0	-3%
Total	\$31,803.5	\$5,404.5	\$37,208.0	\$33,335.3	11.6%

Scenario Assignments:

Practitioner Compensation Assignment:
1995 Compensation Levels

Insurance Assignments:

Urban/Under65: 2005 Baseline Projection, Urban, < 65
 Urban/65+: 2005 Baseline Projection, Urban, 65+
 Rural/Under65: 2005 Baseline Projection, Rural, < 65
 Rural/65+: 2005 Baseline Projection, Rural, 65+

Staffing Model Assignments:

Urban/Staff HMO: 1995 Estimated, Urban, Staff
 Rural/Staff HMO: 1995 Estimated, Rural, Staff
 Urban/IPA HMO: 1995 Estimated, Urban, IPA
 Rural/IPA HMO: 1995 Estimated, Rural, IPA
 Urban/FFS: 1995 Estimated, Urban, FFS
 Rural/FFS: 1995 Estimated, Rural, FFS
 Urban/Uninsured: 1995 Estimated, Urban, Uninsured
 Rural/Uninsured: 1995 Estimated, Rural, Uninsured

Integrated Requirements Model Population By Insurance Category Report

18-Sep-95
08:57

Scenario Year: 2005

Scenario Name: High Managed Care

Scenario Description: For the year 2005 insurance distributions are set to high estimates of HMO penetration and staffing models are set to 1995 estimated values.

Under 65	Urban		Rural		Total	
Staff Model HMO						
Medicaid	5,752,176	2.8%	0	0.0%	5,752,176	2.3%
Other	38,416,316	18.7%	3,257,561	7.1%	41,673,877	16.6%
IPA Model HMO						
Medicaid	6,984,785	3.4%	1,697,602	3.7%	8,682,387	3.5%
Other	92,240,246	44.9%	9,726,801	21.2%	101,967,047	40.6%
Fee For Service						
Medicaid	4,725,001	2.3%	2,523,462	5.5%	7,248,464	2.9%
Other	23,008,703	11.2%	19,453,601	42.4%	42,462,304	16.9%
Uninsured	34,307,619	16.7%	9,222,108	20.1%	43,529,728	17.3%
Total	205,434,847	100.0%	45,881,135	100.0%	251,315,982	100.0%
65 and older	Urban		Rural		Total	
Medicare Staff Model HMO	4,307,213	15.0%	412,750	5.0%	4,719,962	12.8%
Medicare IPA Model HMO	10,050,163	35.0%	1,238,249	15.0%	11,288,412	30.5%
Medicare Fee For Service	14,357,376	50.0%	6,603,994	80.0%	20,961,370	56.7%
Total	28,714,752	100.0%	8,254,993	100.0%	36,969,745	100.0%
All Ages	Urban		Rural		Total	
Staff Model HMO	48,475,705	20.7%	3,670,310	6.8%	52,146,015	18.1%
IPA Model HMO	109,275,194	46.7%	12,662,652	23.4%	121,937,846	42.3%
Fee For Service	42,091,080	18.0%	28,581,058	52.8%	70,672,138	24.5%
Uninsured	34,307,619	14.7%	9,222,108	17.0%	43,529,728	15.1%
Total	234,149,599	100.0%	54,136,128	100.0%	288,285,727	100.0%

Insurance Assignments:

Urban/Under65: 2005 HMC Projection, Urban, < 65
 Urban/65+: 2005 HMC Projection, Urban, 65+
 Rural/Under65: 2005 HMC Projection, Rural, < 65
 Rural/65+: 2005 HMC Projection, Rural, 65+

Integrated Requirements Model Practitioners per 100,000 Report

18-Sep-95
08:58**Scenario Year:** 2005**Scenario Name:** High Managed Care**Scenario Description:** For the year 2005 insurance distributions are set to high estimates of HMO penetration and staffing models are set to 1995 estimated values.

Staff Model HMO	Urban	Rural	Total
Physicians	80.8	54.4	79.0
Physician Assistants	5.5	13.1	6.0
Nurse Practitioners	12.0	8.5	11.8
Certified Nurse Midwives	1.8	1.9	1.8
Total	100.1	77.9	98.5
IPA Model HMO	Urban	Rural	Total
Physicians	88.4	64.3	85.9
Physician Assistants	3.9	9.6	4.5
Nurse Practitioners	10.7	8.3	10.4
Certified Nurse Midwives	1.4	1.9	1.5
Total	104.4	84.1	102.3
Fee For Service	Urban	Rural	Total
Physicians	96.9	63.8	83.5
Physician Assistants	4.4	9.8	6.6
Nurse Practitioners	12.1	8.0	10.4
Certified Nurse Midwives	1.2	1.6	1.4
Total	114.6	83.3	101.9
Uninsured	Urban	Rural	Total
Physicians	48.3	33.8	45.3
Physician Assistants	2.1	5.2	2.7
Nurse Practitioners	9.6	7.1	9.1
Certified Nurse Midwives	0.9	0.9	0.9
Total	60.9	47.0	58.0
All Insurances	Urban	Rural	Total
Physicians	82.5	58.2	77.9
Physician Assistants	4.0	9.2	5.0
Nurse Practitioners	11.0	8.0	10.5
Certified Nurse Midwives	1.4	1.6	1.4
Grand Total	98.9	76.9	94.8

Staffing Model Assignments:

Urban/Staff HMO: 1995 Estimated, Urban, Staff
 Rural/Staff HMO: 1995 Estimated, Rural, Staff
 Urban/IPA HMO: 1995 Estimated, Urban, IPA
 Rural/IPA HMO: 1995 Estimated, Rural, IPA
 Urban/FFS: 1995 Estimated, Urban, FFS
 Rural/FFS: 1995 Estimated, Rural, FFS
 Urban/Uninsured: 1995 Estimated, Urban, Uninsured
 Rural/Uninsured: 1995 Estimated, Rural, Uninsured

Integrated Requirements Model

Primary Care Practitioner Requirements Report

18-Sep-95
08:58

Scenario Year: 2005

Scenario Name: High Managed Care

Scenario Description: For the year 2005 insurance distributions are set to high estimates of HMO penetration and staffing models are set to 1995 estimated values.

Requirements	Urban	Rural	Total	1995 Actual	% Change
Physicians	193,146	31,494	224,639	200,405	12.1%
Physician Assistants	9,445	4,984	14,429	11,960	20.6%
Nurse Practitioners	25,827	4,321	30,148	25,300	19.2%
Certified Nurse Midwives	3,246	852	4,097	4,155	-1.4%
Total	231,664	41,650	273,314	241,820	13.0%

Compensation (\$ millions)	Urban	Rural	Total	1995 Actual	% Change
Physicians	\$29,976.8	\$4,887.9	\$34,864.7	\$31,103.5	12.1%
Physician Assistants	\$531.1	\$280.3	\$811.4	\$672.5	20.6%
Nurse Practitioners	\$1,342.7	\$224.6	\$1,567.3	\$1,315.3	19.2%
Certified Nurse Midwives	\$190.6	\$50.0	\$240.6	\$244.0	-1.4%
Total	\$32,041.2	\$5,442.8	\$37,484.0	\$33,335.3	12.4%

Scenario Assignments:

Practitioner Compensation Assignment:
1995 Compensation Levels

Insurance Assignments:

Urban/Under65: 2005 HMC Projection, Urban, < 65
 Urban/65+: 2005 HMC Projection, Urban, 65+
 Rural/Under65: 2005 HMC Projection, Rural, < 65
 Rural/65+: 2005 HMC Projection, Rural, 65+

Staffing Model Assignments:

Urban/Staff HMO: 1995 Estimated, Urban, Staff
 Rural/Staff HMO: 1995 Estimated, Rural, Staff
 Urban/IPA HMO: 1995 Estimated, Urban, IPA
 Rural/IPA HMO: 1995 Estimated, Rural, IPA
 Urban/FFS: 1995 Estimated, Urban, FFS
 Rural/FFS: 1995 Estimated, Rural, FFS
 Urban/Uninsured: 1995 Estimated, Urban, Uninsured
 Rural/Uninsured: 1995 Estimated, Rural, Uninsured

Integrated Requirements Model Population By Insurance Category Report

18-Sep-95
08:58

Scenario Year: 2005

Scenario Name: Universal Coverage

Scenario Description: For 2005 insurance distributions eliminate the uninsured and use high estimates of HMO penetration. Staffing models are set to 1995 estimated values except for the FFS models, which are adjusted upward to reflect increased coverage of preventive care.

Under 65	Urban		Rural		Total	
Staff Model HMO						
Medicaid	5,752,176	2.8%	0	.0%	5,752,176	2.3%
Other	47,044,580	22.9%	4,175,183	9.1%	51,219,763	20.4%
IPA Model HMO						
Medicaid	6,984,785	3.4%	1,697,602	3.7%	8,682,387	3.5%
Other	112,783,731	54.9%	12,479,669	27.2%	125,263,400	49.8%
Fee For Service						
Medicaid	4,725,001	2.3%	2,523,462	5.5%	7,248,464	2.9%
Other	28,144,574	13.7%	25,005,219	54.5%	53,149,793	21.1%
Uninsured	0	.0%	0	.0%	0	.0%
Total	205,434,847	100.0%	45,881,135	100.0%	251,315,982	100.0%
65 and older	Urban		Rural		Total	
Medicare Staff Model HMO	4,307,213	15.0%	412,750	5.0%	4,719,962	12.8%
Medicare IPA Model HMO	10,050,163	35.0%	1,238,249	15.0%	11,288,412	30.5%
Medicare Fee For Service	14,357,376	50.0%	6,603,994	80.0%	20,961,370	56.7%
Total	28,714,752	100.0%	8,254,993	100.0%	36,969,745	100.0%
All Ages	Urban		Rural		Total	
Staff Model HMO	57,103,968	24.4%	4,587,933	8.5%	61,691,901	21.4%
IPA Model HMO	129,818,679	55.4%	15,415,520	28.5%	145,234,199	50.4%
Fee For Service	47,226,952	20.2%	34,132,675	63.0%	81,359,627	28.2%
Uninsured	0	.0%	0	.0%	0	.0%
Total	234,149,599	100.0%	54,136,128	100.0%	288,285,727	100.0%

Insurance Assignments:

Urban/Under65: 2005 Univ. Coverage Projection, Urban, < 65
 Urban/65+: 2005 Univ. Coverage Projection, Urban, 65+
 Rural/Under65: 2005 Univ. Coverage Projection, Rural, < 65
 Rural/65+: 2005 Univ. Coverage Projection, Rural, 65+

Integrated Requirements Model Practitioners per 100,000 Report

18-Sep-95
08:58**Scenario Year: 2005****Scenario Name: Universal Coverage**

Scenario Description: For 2005 insurance distributions eliminate the uninsured and use high estimates of HMO penetration. Staffing models are set to 1995 estimated values except for the FFS models, which are adjusted upward to reflect increased coverage of preventive care.

Staff Model HMO	Urban	Rural	Total
Physicians	79.4	53.6	77.5
Physician Assistants	5.3	12.5	5.9
Nurse Practitioners	11.7	8.2	11.4
Certified Nurse Midwives	1.8	2.0	1.9
Total	98.3	76.3	96.7
IPA Model HMO	Urban	Rural	Total
Physicians	86.8	63.1	84.3
Physician Assistants	3.7	9.3	4.3
Nurse Practitioners	10.4	8.1	10.1
Certified Nurse Midwives	1.5	1.9	1.5
Total	102.4	82.4	100.3
Fee For Service	Urban	Rural	Total
Physicians	101.9	66.9	87.2
Physician Assistants	4.7	10.3	7.0
Nurse Practitioners	12.8	8.5	11.0
Certified Nurse Midwives	1.3	1.7	1.5
Total	120.6	87.5	106.7
Uninsured	Urban	Rural	Total
Physicians	0.0	0.0	0.0
Physician Assistants	0.0	0.0	0.0
Nurse Practitioners	0.0	0.0	0.0
Certified Nurse Midwives	0.0	0.0	0.0
Total	0.0	0.0	0.0
All Insurances	Urban	Rural	Total
Physicians	88.0	64.7	83.7
Physician Assistants	4.3	10.2	5.4
Nurse Practitioners	11.2	8.3	10.6
Certified Nurse Midwives	1.5	1.8	1.6
Grand Total	105.0	85.1	101.3

Staffing Model Assignments:

Urban/Staff HMO: 1995 Estimated, Urban, Staff
 Rural/Staff HMO: 1995 Estimated, Rural, Staff
 Urban/IPA HMO: 1995 Estimated, Urban, IPA
 Rural/IPA HMO: 1995 Estimated, Rural, IPA
 Urban/FFS: 2005 Preventive Care, Urban, FFS
 Rural/FFS: 2005 Preventive Care, Rural, FFS
 Urban/Uninsured: 1995 Estimated, Urban, Uninsured
 Rural/Uninsured: 1995 Estimated, Rural, Uninsured

Integrated Requirements Model

Primary Care Practitioner Requirements Report

18-Sep-95
08.58**Scenario Year:** 2005**Scenario Name:** Universal Coverage

Scenario Description: For 2005 insurance distributions eliminate the uninsured and use high estimates of HMO penetration. Staffing models are set to 1995 estimated values except for the FFS models, which are adjusted upward to reflect increased coverage of preventive care.

Requirements	Urban	Rural	Total	1995	% Change
				Actual	
Physicians	206,144	35,026	241,170	200,405	20.3%
Physician Assistants	10,108	5,526	15,634	11,960	30.7%
Nurse Practitioners	26,140	4,516	30,656	25,300	21.2%
Certified Nurse Midwives	3,564	986	4,550	4,155	9.5%
Total	245,955	46,053	292,009	241,820	20.8%

Compensation (\$ millions)	Urban	Rural	Total	1995	% Change
				Actual	
Physicians	\$31,994.1	\$5,436.1	\$37,430.2	\$31,103.5	20.3%
Physician Assistants	\$568.4	\$310.7	\$879.1	\$672.5	30.7%
Nurse Practitioners	\$1,359.0	\$234.8	\$1,593.7	\$1,315.3	21.2%
Certified Nurse Midwives	\$209.3	\$57.9	\$267.2	\$244.0	9.5%
Total	\$34,130.7	\$6,039.5	\$40,170.2	\$33,335.3	20.5%

Scenario Assignments:

Practitioner Compensation Assignment:
1995 Compensation Levels

Insurance Assignments:

Urban/Under65: 2005 Univ. Coverage Projection, Urban, < 65
 Urban/65+: 2005 Univ. Coverage Projection, Urban, 65+
 Rural/Under65: 2005 Univ. Coverage Projection, Rural, < 65
 Rural/65+: 2005 Univ. Coverage Projection, Rural, 65+

Staffing Model Assignments:

Urban/Staff HMO: 1995 Estimated, Urban, Staff
 Rural/Staff HMO: 1995 Estimated, Rural, Staff
 Urban/IPA HMO: 1995 Estimated, Urban, IPA
 Rural/IPA HMO: 1995 Estimated, Rural, IPA
 Urban/FFS: 2005 Preventive Care, Urban, FFS
 Rural/FFS: 2005 Preventive Care, Rural, FFS
 Urban/Uninsured: 1995 Estimated, Urban, Uninsured
 Rural/Uninsured: 1995 Estimated, Rural, Uninsured

Integrated Requirements Model Population By Insurance Category Report

18-Sep-95
10:06

Scenario Year: 2005

Scenario Name: Equal Access Under Universal Coverage

Scenario Description: This scenario is equivalent to the 2005 universal coverage scenario except that it provides for parity across races in access to primary care.

Under 65	Urban		Rural		Total	
Staff Model HMO						
Medicaid	5,752,176	2.8%	0	0.0%	5,752,176	2.3%
Other	47,044,580	22.9%	4,175,183	9.1%	51,219,763	20.4%
IPA Model HMO						
Medicaid	6,984,785	3.4%	1,697,602	3.7%	8,682,387	3.5%
Other	112,783,731	54.9%	12,479,669	27.2%	125,263,400	49.8%
Fee For Service						
Medicaid	4,725,001	2.3%	2,523,462	5.5%	7,248,464	2.9%
Other	28,144,574	13.7%	25,005,219	54.5%	53,149,793	21.1%
Uninsured	0	0.0%	0	0.0%	0	0.0%
Total	205,434,847	100.0%	45,881,135	100.0%	251,315,982	100.0%
65 and older	Urban		Rural		Total	
Medicare Staff Model HMO	4,307,213	15.0%	412,750	5.0%	4,719,962	12.8%
Medicare IPA Model HMO	10,050,163	35.0%	1,238,249	15.0%	11,288,412	30.5%
Medicare Fee For Service	14,357,376	50.0%	6,603,994	80.0%	20,961,370	56.7%
Total	28,714,752	100.0%	8,254,993	100.0%	36,969,745	100.0%
All Ages	Urban		Rural		Total	
Staff Model HMO	57,103,968	24.4%	4,587,933	8.5%	61,691,901	21.4%
IPA Model HMO	129,818,679	55.4%	15,415,520	28.5%	145,234,199	50.4%
Fee For Service	47,226,952	20.2%	34,132,675	63.0%	81,359,627	28.2%
Uninsured	0	0.0%	0	0.0%	0	0.0%
Total	234,149,599	100.0%	54,136,128	100.0%	288,285,727	100.0%

Insurance Assignments:

Urban/Under65: 2005 Univ. Coverage Projection, Urban, < 65
 Urban/65+: 2005 Univ. Coverage Projection, Urban, 65+
 Rural/Under65: 2005 Univ. Coverage Projection, Rural, < 65
 Rural/65+: 2005 Univ. Coverage Projection, Rural, 65+

Integrated Requirements Model Practitioners per 100,000 Report

18-Sep-95
10:06

Scenario Year: 2005

Scenario Name: Equal Access Under Universal Coverage

Scenario Description: This scenario is equivalent to the 2005 universal coverage scenario except that it provides for parity across races in access to primary care.

Staff Model HMO	Urban	Rural	Total
Physicians	81.0	54.6	79.1
Physician Assistants	5.4	12.7	6.0
Nurse Practitioners	11.9	8.4	11.6
Certified Nurse Midwives	1.9	2.1	1.9
Total	100.3	77.8	98.6
IPA Model HMO	Urban	Rural	Total
Physicians	88.5	64.3	86.0
Physician Assistants	3.8	9.5	4.4
Nurse Practitioners	10.6	8.3	10.3
Certified Nurse Midwives	1.5	2.0	1.5
Total	104.4	84.1	102.3
Fee For Service	Urban	Rural	Total
Physicians	103.9	68.3	88.9
Physician Assistants	4.8	10.5	7.2
Nurse Practitioners	13.0	8.6	11.2
Certified Nurse Midwives	1.3	1.8	1.5
Total	123.0	89.2	108.8
Uninsured	Urban	Rural	Total
Physicians	0.0	0.0	0.0
Physician Assistants	0.0	0.0	0.0
Nurse Practitioners	0.0	0.0	0.0
Certified Nurse Midwives	0.0	0.0	0.0
Total	0.0	0.0	0.0
All Insurances	Urban	Rural	Total
Physicians	89.8	66.0	85.3
Physician Assistants	4.4	10.4	5.5
Nurse Practitioners	11.4	8.5	10.8
Certified Nurse Midwives	1.6	1.9	1.6
Grand Total	107.1	86.8	103.3

Staffing Model Assignments:

Urban/Staff HMO: 2005 Equal Access, Urban, Staff
 Rural/Staff HMO: 2005 Equal Access, Rural, Staff
 Urban/IPA HMO: 2005 Equal Access, Urban, IPA
 Rural/IPA HMO: 2005 Equal Access, Rural, IPA
 Urban/FFS: 2005 Equal Access, Urban, FFS
 Rural/FFS: 2005 Equal Access, Rural, FFS
 Urban/Uninsured: 2005 Equal Access, Urban, Uninsured
 Rural/Uninsured: 2005 Equal Access, Rural, Uninsured

Integrated Requirements Model

Primary Care Practitioner Requirements Report

18-Sep-95
10:06

Scenario Year: 2005

Scenario Name: Equal Access Under Universal Coverage

Scenario Description: This scenario is equivalent to the 2005 universal coverage scenario except that it provides for parity across races in access to primary care.

Requirements	Urban	Rural	Total	1995 Actual	% Change
Physicians	210,267	35,726	245,993	200,405	22.7%
Physician Assistants	10,310	5,637	15,946	11,960	33.3%
Nurse Practitioners	26,663	4,606	31,269	25,300	23.6%
Certified Nurse Midwives	3,636	1,005	4,641	4,155	11.7%
Total	250,875	46,974	297,849	241,820	23.2%

Compensation (\$ millions)	Urban	Rural	Total	1995 Actual	% Change
Physicians	\$32,634.0	\$5,544.8	\$38,178.8	\$31,103.5	22.7%
Physician Assistants	\$579.7	\$317.0	\$896.7	\$672.5	33.3%
Nurse Practitioners	\$1,386.1	\$239.5	\$1,625.6	\$1,315.3	23.6%
Certified Nurse Midwives	\$213.5	\$59.0	\$272.5	\$244.0	11.7%
Total	\$34,813.4	\$6,160.3	\$40,973.6	\$33,335.3	22.9%

Scenario Assignments:

Practitioner Compensation Assignment:
1995 Compensation Levels

Insurance Assignments:

Urban/Under65: 2005 Univ. Coverage Projection, Urban, < 65
 Urban/65+: 2005 Univ. Coverage Projection, Urban, 65+
 Rural/Under65: 2005 Univ. Coverage Projection, Rural, < 65
 Rural/65+: 2005 Univ. Coverage Projection, Rural, 65+

Staffing Model Assignments:

Urban/Staff HMO: 2005 Equal Access, Urban, Staff
 Rural/Staff HMO: 2005 Equal Access, Rural, Staff
 Urban/IPA HMO: 2005 Equal Access, Urban, IPA
 Rural/IPA HMO: 2005 Equal Access, Rural, IPA
 Urban/FFS: 2005 Equal Access, Urban, FFS
 Rural/FFS: 2005 Equal Access, Rural, FFS
 Urban/Uninsured: 2005 Equal Access, Urban, Uninsured
 Rural/Uninsured: 2005 Equal Access, Rural, Uninsured

Integrated Requirements Model Population By Insurance Category Report

18-Sep-95
09:18

Scenario Year: 2005

Scenario Name: High PA, NP, CNM Use

Scenario Description: PA, NP, and CNM substitution ratios are increased from .4 to .5 and non-physician use is doubled, reducing physicians accordingly. Projected insurance distributions are set to best estimates.

Under 65	Urban		Rural		Total	
Staff Model HMO						
Medicaid	1,955,046	1.0%	0	.0%	1,955,046	.8%
Other	28,122,580	13.7%	1,393,946	3.0%	29,516,526	11.7%
IPA Model HMO						
Medicaid	3,708,415	1.8%	511,113	1.1%	4,219,528	1.7%
Other	74,335,923	36.2%	6,255,182	13.6%	80,591,105	32.1%
Fee For Service						
Medicaid	11,565,936	5.6%	3,656,290	8.0%	15,222,226	6.1%
Other	51,834,391	25.2%	25,009,658	54.5%	76,844,049	30.6%
Uninsured	33,912,556	16.5%	9,054,947	19.7%	42,967,503	17.1%
Total	205,434,847	100.0%	45,881,135	100.0%	251,315,982	100.0%
65 and older						
Medicare Staff Model HMO	1,832,313	6.4%	92,588	1.1%	1,924,901	5.2%
Medicare IPA Model HMO	3,498,630	12.2%	374,868	4.5%	3,873,498	10.5%
Medicare Fee For Service	23,383,809	81.4%	7,787,537	94.3%	31,171,346	84.3%
Total	28,714,752	100.0%	8,254,993	100.0%	36,969,745	100.0%
All Ages						
Staff Model HMO	31,909,939	13.6%	1,486,533	2.7%	33,396,472	11.6%
IPA Model HMO	81,542,969	34.8%	7,141,163	13.2%	88,684,132	30.8%
Fee For Service	86,784,136	37.1%	36,453,485	67.3%	123,237,620	42.7%
Uninsured	33,912,556	14.5%	9,054,947	16.7%	42,967,503	14.9%
Total	234,149,599	100.0%	54,136,128	100.0%	288,285,727	100.0%

Insurance Assignments:

Urban/Under65: 2005 Baseline Projection, Urban, < 65
 Urban/65+: 2005 Baseline Projection, Urban, 65+
 Rural/Under65: 2005 Baseline Projection, Rural, < 65
 Rural/65+: 2005 Baseline Projection, Rural, 65+

Integrated Requirements Model Practitioners per 100,000 Report

18-Sep-95
09:18**Scenario Year:** 2005**Scenario Name:** High PA, NP, CNM Use

Scenario Description: PA, NP, and CNM substitution ratios are increased from .4 to .5 and non-physician use is doubled, reducing physicians accordingly. Projected insurance distributions are set to best estimates.

Staff Model HMO	Urban	Rural	Total
Physicians	67.7	39.7	66.4
Physician Assistants	10.6	24.2	11.2
Nurse Practitioners	23.0	16.2	22.7
Certified Nurse Midwives	3.8	4.0	3.8
Total	105.0	84.0	104.1
IPA Model HMO	Urban	Rural	Total
Physicians	76.3	50.7	74.2
Physician Assistants	7.2	18.4	8.1
Nurse Practitioners	20.2	15.8	19.8
Certified Nurse Midwives	3.0	4.0	3.1
Total	106.7	88.9	105.3
Fee For Service	Urban	Rural	Total
Physicians	83.2	51.6	73.9
Physician Assistants	8.2	19.4	11.5
Nurse Practitioners	22.6	15.8	20.6
Certified Nurse Midwives	2.6	3.4	2.8
Total	116.6	90.2	108.8
Uninsured	Urban	Rural	Total
Physicians	40.8	25.9	37.6
Physician Assistants	4.2	10.4	5.5
Nurse Practitioners	19.2	14.2	18.1
Certified Nurse Midwives	1.8	1.8	1.8
Total	65.9	52.3	63.0
All Insurances	Urban	Rural	Total
Physicians	72.5	46.9	67.7
Physician Assistants	7.6	17.9	9.5
Nurse Practitioners	21.3	15.5	20.2
Certified Nurse Midwives	2.8	3.2	2.9
Grand Total	104.2	83.5	100.3

Staffing Model Assignments:

Urban/Staff HMO: 2005 High PA, NP, CNM Use, Urban, Staff
 Rural/Staff HMO: 2005 High PA, NP, CNM Use, Rural, Staff
 Urban/IPA HMO: 2005 High PA, NP, CNM Use, Urban, IPA
 Rural/IPA HMO: 2005 High PA, NP, CNM Use, Rural, IPA
 Urban/FFS: 2005 High PA, NP, CNM Use, Urban, FFS
 Rural/FFS: 2005 High PA, NP, CNM Use, Rural, FFS
 Urban/Uninsured: 2005 High PA, NP, CNM Use, Urban, Uninsured
 Rural/Uninsured: 2005 High PA, NP, CNM Use, Rural, Uninsured

Integrated Requirements Model

Primary Care Practitioner Requirements Report

18-Sep-95
09:18**Scenario Year:** 2005**Scenario Name:** High PA, NP, CNM Use

Scenario Description: PA, NP, and CNM substitution ratios are increased from .4 to .5 and non-physician use is doubled, reducing physicians accordingly. Projected insurance distributions are set to best estimates.

<u>Requirements</u>	<u>Urban</u>	<u>Rural</u>	<u>Total</u>	1995 <u>Actual</u>	<u>% Change</u>
Physicians	169,822	25,386	195,208	200,405	-2.6%
Physician Assistants	17,835	9,668	27,503	11,960	130.0%
Nurse Practitioners	49,870	8,416	58,286	25,300	130.4%
Certified Nurse Midwives	6,547	1,737	8,283	4,155	99.3%
Total	244,074	45,207	289,281	241,820	19.6%

<u>Compensation (\$ millions)</u>	<u>Urban</u>	<u>Rural</u>	<u>Total</u>	1995 <u>Actual</u>	<u>% Change</u>
Physicians	\$26,357.0	\$3,940.0	\$30,296.9	\$31,103.5	-2.6%
Physician Assistants	\$1,002.9	\$543.6	\$1,546.5	\$672.5	130.0%
Nurse Practitioners	\$2,592.6	\$437.5	\$3,030.2	\$1,315.3	130.4%
Certified Nurse Midwives	\$384.4	\$102.0	\$486.4	\$244.0	99.3%
Total	\$30,336.9	\$5,023.1	\$35,360.0	\$33,335.3	6.1%

Scenario Assignments:

Practitioner Compensation Assignment:
1995 Compensation Levels

Insurance Assignments:

Urban/Under65: 2005 Baseline Projection, Urban, < 65
 Urban/65+: 2005 Baseline Projection, Urban, 65+
 Rural/Under65: 2005 Baseline Projection, Rural, < 65
 Rural/65+: 2005 Baseline Projection, Rural, 65+

Staffing Model Assignments:

Urban/Staff HMO: 2005 High PA, NP, CNM Use, Urban, Staff
 Rural/Staff HMO: 2005 High PA, NP, CNM Use, Rural, Staff
 Urban/IPA HMO: 2005 High PA, NP, CNM Use, Urban, IPA
 Rural/IPA HMO: 2005 High PA, NP, CNM Use, Rural, IPA
 Urban/FFS: 2005 High PA, NP, CNM Use, Urban, FFS
 Rural/FFS: 2005 High PA, NP, CNM Use, Rural, FFS
 Urban/Uninsured: 2005 High PA, NP, CNM Use, Urban, Uninsured
 Rural/Uninsured: 2005 High PA, NP, CNM Use, Rural, Uninsured

5.0 CONCLUSIONS AND RECOMMENDATIONS

It is widely agreed that the spread of managed care and competitive pressures in the health care arena are altering health care workforce requirements. The research conducted in the development of the integrated requirements model, and the six scenarios to which it has been applied in this report, shed light on how requirements for primary care practitioners are being affected.

In assessing what has been learned, it is convenient to begin with an examination of the staffing models estimated for each of the eight aggregated delivery settings. An awareness of how these staffing models differ is essential to the proper interpretation of the scenario results.

5.1 STAFFING MODEL VARIATIONS BY DELIVERY SETTING

Exhibit 5-1 displays aggregate staffing ratios for each of the eight delivery settings, standardized to the total 1995 population. One of the key features of the IRM staffing models is that they adjust automatically to changes in the age/sex composition of the population. Thus, to make fair comparisons, they must be applied to a standard population. The 1995 national population was chosen for this purpose. Ratios in this exhibit represent practitioners per 100,000 population implied by the staffing models, assuming they are applied to the total US population as of 1995.

Exhibit 5-1: 1995 Staffing Ratios Standardized to US Population

	Practitioners Per 100,000			
Urban	PCPs	PAs	NPs	CNMs
Staff HMO	82	5.5	12.0	1.9
IPA HMO	89	3.9	10.8	1.4
Fee-for-Service	84	3.4	9.5	1.7
Uninsured	45	1.9	9.0	.8
Rural				
Staff HMO	54	12.9	7.8	2.0
IPA HMO	64	9.3	8.2	2.0
Fee-for-Service	59	8.4	6.9	2.1
Uninsured	31	4.7	6.3	.8
Total US	76	4.5	9.6	1.6

Examination of these standardized staffing models suggests that:

- primary care staffing ratios are not affected nearly as much by managed care as they are by distinctions between insured and uninsured and between urban and rural populations;
- NPs and PAs are used somewhat more intensively under managed care;
- with the exception of NPs, staffing ratios are much smaller for uninsured populations; and
- PAs treat a disproportionate share of rural populations.

Based upon these observations, the spread of managed care alone can be expected to have relatively small effects on primary care practitioner requirements, except possibly for PAs

and NPs. On the other hand, changes in the size of the uninsured population could significantly impact requirements for all practitioners except NPs. These deductions are supported by the scenario results.

5.2 CONCLUSIONS FROM SCENARIO ANALYSES

Exhibit 5-2 summarizes findings from the scenario analyses. It shows the increase in practitioner requirements, relative to 1995 levels, under each of the six scenarios. It is interesting to compare these percentage increases to the 9.4% increase in the US population over the same period.

Exhibit 5-2: Percent Increase in Requirements Relative to 1995

	Status Quo	Baseline Insurance Projection	High Managed Care	Universal Coverage	Equal Access Under Universal Coverage	High NP, PA, CNM Use
PCPs	10.4%	11.5%	12.1%	20.3%	22.7%	-2.6%
PAs	11.4%	15.1%	20.6%	30.7%	33.3%	130.0%
NPs	12.3%	15.4%	19.2%	21.2%	23.6%	130.4%
CNMs	1.8%	-0.3%	-1.4%	9.5%	11.7%	99.3%

The results of the status quo scenario show that, in the absence of changes in insurance distributions and staffing models, the requirements for primary care physicians (PCPs), PAs, and NPs do just a bit better than keep pace with population growth. CNMs lag way behind, because of the lack of growth in the female population of child bearing ages.

The baseline insurance projection scenario and high managed care scenarios represent varying degrees of increase in HMO penetration, with emphasis on IPA model HMO growth. Given current staffing model estimates, the spread of managed care has little impact on PCP or CNM requirements, but does result in a significant increase in PA and NP requirements. For example, in the high managed care scenario, PCP requirements

grow by about 12% from 1995, whereas they grew by over 10% with no growth in managed care. On the other hand, PA requirements grow by over 20% under high managed care and by less than 12% with no managed care growth.

Under universal coverage, requirements for all practitioners except NPs are increased significantly. This was predicted from examination of the staffing models which show that all but NP staffing ratios are significantly less for uninsured populations. Although not shown in the exhibit, the detailed scenario results show that covering the uninsured results in an increase of about 7% in PCPs, 8% in PAs, 2% in NPs, and 11% in CNMs. Augmenting universal coverage with a program to equalize access to care for otherwise underserved populations results in an estimated increase in practitioner requirements of 2% above the straight universal coverage scenario.

The final scenario shows that a hypothetical increase in the productivity ratio of non-physicians from .40 to .50, combined with a doubling in the use of non-physicians, reduces physician requirements back to slightly under 1995 levels. Of course, this conclusion hinges upon the assumption of a .50 productivity ratio. The reduction in physician requirements would be even greater if the ratio were greater.

These scenario results suggest that the spread of managed care does not dramatically alter primary care practitioner requirements unless there are other forces causing changes in current staffing models. The next section presents some conclusions regarding what has been learned about potential changes in future staffing models.

5.3 SOME OBSERVATIONS ON ALTERNATIVE STAFFING MODELS

Compelling empirical evidence as to where staffing models might be headed was not found. Data on HMO staffing, when not rendered useless by definitional problems or data gaps, tends to show wide variations in staffing patterns. It is simply not possible to draw any conclusions on where best practices may be headed.

Reviews of the literature suggest that while it is feasible to organize a practice such that non-physicians are nearly as productive as physicians (a substitution ratio near 1.0), this is not the norm. Instead, non-physicians generally tend to spend more time with their patients and, as a result, cannot care for as large a patient population as a physician can.

While there is undoubtedly a wide variation in substitution ratios found in current practice, a value of .40 seems to be in the middle of the range of estimates.

This .40 ratio could simply reflect the fact that PAs and NPs cost about 40% of what a primary care physician costs and, thus, they can be about 40% as productive (i.e., spend a little more than twice as much time with their patients) and still be cost effective. It seems possible that aggressive, bottom-line oriented HMOs will ultimately push for greater productivity in their non-physicians and drive the substitution ratio upward. However, no empirical evidence of trends in this direction was found. The high PA/NP/CNM use scenario, therefore, is hypothetical rather than a firm prediction of where the market is heading at this time.

5.4 RECOMMENDATIONS

While there are no obvious trends in currently available data on HMO staffing models, there is a high level of interest and research in this area. Results should be carefully monitored and, as trends become clearer, they should be incorporated into the model. The model has been designed to make this easy to accomplish by the average user.

A key result of the scenarios analyzed is the rather mild impact of managed care on primary care practitioner requirements. This is not necessarily an obvious result, but is not counter-intuitive either. Managed care includes incentives for efficiency that push in the direction of reducing workforce to population ratios. However, in the case of primary care practitioners, this downward pressure is potentially offset by the cost advantages of shifting care to primary care practitioners from specialists. To the extent that these two forces are offsetting, managed care will have small effects on primary care practitioner ratios.

In the case of specialists, the forces are not offsetting — both push in the direction of reducing the use of specialists. To gain a full picture of workforce trends, it would be most useful to include specialists in the integrated requirements analysis.

APPENDIX A: THE LITERATURE SEARCH

This appendix contains the results of the literature search on primary care staffing options, primary care demand, and health care reform initiatives.

A-2



VRI-HRSA-15 WP95-01(R)

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10 March 1995

DEVELOPMENT OF INTEGRATED REQUIREMENTS
FOR PAs, NPs, CNMs, AND PHYSICIANS (MDs and DOs)

Literature Search

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FOREWORD

This report documents the literature searches for the project, **Development of Integrated Requirements for PAs, NPs, CNMs and Physicians**. This work has been performed for the Health Resources and Services Administration, under contract number 240-94-0033, by Vector Research, Incorporated, and its subcontractors Research Triangle Institute and Lewin-VHI.

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Part I:
Primary Care Services
Delivery Options

1.0 INTRODUCTION

This report documents the results of our literature searches on primary care delivery options, primary care services demand, potential health care reform scenarios and considerations, and their implications on the integrated requirements modeling effort. Specifically, it discusses the data and information sources that have been identified and reviewed, and their potential availability and usefulness for assisting with the model design and with the estimation of model input parameters. This report is comprised of three parts. Parts I and II are write-ups for the two basic areas being reviewed: primary care services delivery options and primary care services demand/health care reform scenarios, respectively. At the end of each of these two parts are the references and bibliographies of the sources cited and used. The final part of this report, Part III, is a summary of implications of the previous two parts upon the modeling effort.

Part I is comprised of chapters 2.0 through 5.0 and covers primary care services delivery options. Chapter 2.0 discusses the search process used and presents some general concepts and observations. Chapter 3.0 discusses staffing configurations and considerations for the four practitioner groups. Topics covered include existing data, staffing levels, urban/rural differences, and off-loading. Chapter 4.0 covers the various ways practitioner productivity can be measured and the factors that affect practitioner productivity. Chapter 5.0 discusses the cost effectiveness of the four practitioner groups.

Part II is comprised of chapters 6.0 and 7.0 and covers primary care services demand and potential health care reform scenarios. Chapter 6.0 addresses sources of information on aspects of primary care demand that have been identified as crucial to model development, including useful measures of primary care services demanded; how demand varies by age, sex, race, location, and ethnicity; how demand is affected by health care delivery setting; and how demand is affected by macroeconomic variables such as per capita income. Chapter 7.0 is concerned with the selection of potential health care reform scenarios. Topics covered include general observations, the influence of market trends, government intervention features, and alternative staffing models.

Part III contains one chapter, chapter 8.0, and discusses the implications of the previous two sections on the modeling effort.

2.0 SEARCH PROCESS AND GENERAL OBSERVATIONS

2.1 EXTENT OF SEARCH

The literature was searched to identify studies on the type of primary care services that could effectively be provided by each type of primary care practitioner, the practitioner's productivity, and the barriers nonphysician practitioners may encounter in providing primary care services. In assessing the productivity of each type of practitioner, we were interested not only in the productivity, but also in whether it varied by working environment (e.g., urban versus rural, managed care versus fee-for-service (FFS), size of practice, and delegatory style). We also searched for information on the different types of staffing models that are being used to provide primary care services and how the quality of care compares among the different types of providers.

We searched for both legal and nonlegal barriers. We wanted to know the effect that federal and state laws, rules, regulations, and policies have on the practice environment. We also wanted to know about physicians' delegatory behavior and patients' attitudes toward being seen by a nonphysician practitioner.

We undertook computer searches of several major literature databases relevant to this study — Health Planning and Administration, Medline, Educational Resources Information Center (ERIC), Dissertation Abstracts, Federal Research in Progress, the National Technical Information Center (NTIS), and Sociological Abstracts. We also called key individuals to identify important references and databases we may have missed through the literature search. The computer searches yielded several hundred citations. These citations were reviewed and copies of over 400 references were requested.

As an aid to readers, we have prepared both a reference list containing only documents cited in the text of this report and a full (42-page) bibliography listing all relevant products of the literature review. The reference list immediately follows the final chapter of Part I; the complete bibliography appears at the end of Part I.

2.2 GENERAL OBSERVATIONS

2.2.1 Trends in Nonphysician Practitioner Research

Nurse practitioners (NPs) and physician assistants (PAs) started to practice during the 1960s as a result of the shortage of primary care providers. During the 1970s, the federal government and some private organizations made funds available to study these practitioners to assess the services they could provide, the quality of care they provided, their productivity, and other issues. Once the major issues had been addressed, the funding subsided, such that only a few quantitative studies were conducted during the 1980s. These were often concerned with staffing within health maintenance organizations (HMOs). Thus, most of the literature on PAs and NPs dates back to the 1970s (Clawson and Osterweis, 1993).

In the 1990s, several factors emphasized the rising need for primary care providers. These factors included: the rapid increase in the proportion of the population enrolled in a managed care program, interest in developing a physician workforce made up of 50% primary care providers, the push to provide universal health care coverage, and the continued interest in reducing health care costs. With this apparent increase in the need for primary care providers, concern arose as to the adequacy of the supply. Once again, there was interest in studying the supply of, and requirements for, primary care practitioners, including the practitioner mix that could provide the services most cost effectively. Many of the recent studies have relied largely on the data generated during the 1970s, although a few original studies were done or are now being undertaken.

2.2.2 Major Reviews

Since the 1970s there have been some major reviews of the literature. The most cited review was published in 1986 by the Office of Technology Assessment (OTA). This summary addressed the literature on the quality of care provided by NPs, PAs, and certified nurse midwives (CNMs); access to care; productivity, cost, and employment of the nonphysician providers; and payment issues. Because of the relevancy of its contents to this study, we have used its findings as a summary of the early materials.

A more recent assessment of studies on NPs and CNMs in primary care roles was a meta-analysis undertaken by Brown and Grimes (1993). The conclusions from this study addressed the quality and cost-effectiveness of care provided by NPs and CNMs, noted

that most studies were conducted in urban rather than rural areas, and identified the areas where additional research was needed.

Another summary document (Ventura, et. al., 1985) provides a synthesis on the effectiveness of nurse practitioners.

2.2.3 Quality of Care

Much of the literature that we identified was concerned with the quality of care provided by NPs, PAs, and CNMs. Overwhelmingly, the literature indicated that the quality of care provided by NPs, PAs, and CNMs in their areas of competency was at least as good as that provided by physicians. OTA (1986) concluded that

within their areas of competence, NPs, PAs, and CNMs provide care whose quality is equivalent to that of care provided by physicians (p. 19).

Brown and Grimes, in their meta-analysis, concluded that

NPs and CNMs had patient outcomes equivalent to or slightly better than those of physicians (p. 28).

These findings are important to this study since quality will not be explicitly represented as a parameter in the model. We can safely assume that as long as providers are working within their areas of competency, quality of care is maintained.

2.2.4 Relevance of Studies to Today's Environment

During the 1970s the NP and PA programs were in their infancy. Since that time, the educational preparation of the NPs and PAs has increased significantly and the role of these nonphysician practitioners has expanded. The question then arises as to the relevancy of the early studies to the current practice of NPs and PAs. Because of the improvements in the programs that prepare NPs and PAs, it would appear that the quality of care they provide is at least as good, the type of services they can provide (scope of practice) is, at a minimum, as broad, and their productivity is as high, or higher, than it was in the 1960s and 1970s.

Nurse midwives, because their occupation has been in existence for a longer period of time, did not receive the same amount of attention the "new providers" received during the '70s. Most of the nurse midwifery studies have focused on the quality of care they provide and minimally on productivity and cost effectiveness.

3.0 STAFFING CONFIGURATIONS AND CONSIDERATIONS

3.1 EXISTING DATA ON STAFFING PATTERNS

One of the more important aspects of the model is to project the requirements for the different types of practitioners. To make this sort of projection, we must know what data are available on staffing patterns. Some potential data sources that may be of interest to this study are as follows.

- The annual HMO industry surveys and personnel data collection initiatives sponsored by the Group Health Association of America (GHAA). Some information is available from the 1993 edition of the *HMO Industry Profile*.
- Rentmeester and Kindig (1994) obtained data on five staff/group and two Independent Practice Association (IPA)/network model HMOs. Their data on the two IPA plans are limited due to the difficulty in obtaining information on physicians' full-time equivalent staffing. Staff/group model HMO data include information on primary care physicians, medical subspecialists, surgical specialists, and nonphysician practitioners.
- Mulhausen and McGee (1989) reported staffing data on seven Kaiser Permanente HMOs for 1983. Staffing ratios by physician specialty — including primary care and subspecialties for internal medicine — are provided. Staffing ratios for nonphysicians are not provided. We contacted Kaiser Permanente's research center about the availability of current data on Kaiser's staffing patterns. We were referred to administrative executives to determine whether the data would be available.
- Preliminary contact has been made with the Carle Clinic in Urbana, Illinois, to explore the availability of data from their practices. They indicated a willingness to provide the data, but our request for data has not been finalized. Data from this source would include staffing used to care for a large rural population that received services through both managed care and FFS arrangements.
- Data collected by Jack Geller and presented by Richard Scheffler at the December 1994 meeting of the Workgroup on Primary Care Workforce Projections appears to be valuable to this study. We are investigating its availability.
- Data on the staffing patterns used in community health centers is retained by the Bureau of Primary Health Care. Discussions with the Bureau indicate these data can apparently be made available for this study.
- Data on the supply of physicians, physician assistants, and CNMs are available from their respective professional associations.

- Information collected by Hooker (1993) concerning the productivity of PAs and NPs in a managed care organization.
- Data on NPs and CNMs are available from the Survey of Certified Nurse Practitioners and Clinical Specialists (Washington Consulting Group, 1992) and the National Sample Survey of Registered Nurses (Moses, 1994).
- Data that the University of North Dakota has collected on PAs under a grant from the Office of Rural Health Policy, HRSA.
- Data collected by Kenneth Harbert, formerly of Geissenger Medical Center in Pennsylvania, on PA use at that facility.

Much of the published staffing data are on group and staff model HMOs. These staffing data are based on serving a specific population that is not necessarily representative of the US. If these HMO staffing data are to be used to estimate the number of practitioners needed to serve different populations, then adjustments will need to be made to the staffing ratios (practitioners/100,000 population) to reflect the population's need. Also, adjustments will need to be made to account for out-of-plan use.

In using staffing data, Kindig (1994) cautions that assuming that all physicians in a primary, self-designated specialty are equivalent is unacceptably crude for workforce planning. Hence, whenever existing data are to be used in the model, care should be taken to examine practitioner characteristics. Consideration should be given to: retired and part-time practitioners; federally-employed physicians; physicians who spend part- or full-time in education, research, or administration; amount of time the physician spends in primary care rather than some subspecialty; and other factors.

3.2 MINIMUM PHYSICIAN STAFFING LEVELS

Some concern has been expressed about minimum physician staffing levels. Dr. Tilford, an assistant regional director of Kaiser Northwest, is reported as saying that "in call coverage you have to be prepared to take anything that comes your way. Nonphysicians can't do that" (Page, 1993). This view is supported by Mr. James Bernstein (personal conversation with author, November 1994), an advocate of using NPs and PAs. He indicated that a minimum of four physicians in an area is required to provide adequate call coverage, even if it is backup coverage to nonphysician practitioners. A practice can operate with fewer physicians for a short period of time; however, Mr.

Bernstein believes that with fewer than four physicians, the physicians will eventually burn out and leave. Call coverage may also be provided by arrangements with other practices. In rural areas, arrangements for call coverage may be more of a problem than in more populated areas where there are more providers. Harris and Leininger (1993) report that rural physicians tend to have small on-call groups of two to three physicians and, thus, are on call often.

3.3 LEGAL AND BEHAVIORAL BARRIERS

NPs, PAs, and CNMs can practice only to the extent allowed by law. Further, when they are working for or with a physician, they can perform only what the physician permits. Several studies have been undertaken that indicate the barriers NPs, PAs, and CNMs encounter in their practice. Henderson and Chovan (1994) reported barriers in four general categories — educational barriers, legal/regulatory barriers, economic/financial barriers, and public/professional barriers. Sekscenski, et. al., (1994) rated all the states. They concluded that the states' regulation of PAs, NPs, and CNMs varies widely and that favorable practice environments are strongly associated with a larger supply of these practitioners. Pearson (1993, 1994, for example) annually reports on the status of state legislation and how it affects the practice of NPs. Safriet (1994) reported on the impediments to progress in the health care workforce. In her extensive article, she focused on license and policy law. Jones, Mullinix, and others (1994) are currently undertaking a study of NPs and PAs in which laws, rules, regulations, and policies in a sample of states are being reviewed to assess the impact on the NP and PA practice environment. Hanson (1992), reporting on a study conducted by the National Rural Health Association, specified barriers incurred by nonphysician providers in rural areas and how they affected access to rural health care. The barriers included: federal and state regulations that impeded reimbursement and prescriptive authority, liability and malpractice insurance issues, and consumer education concerns.

In addition to barriers that inhibit the practice of nonphysician practitioners, there are barriers that affect establishing certain types of practice settings. Lubic (1979) reported on the barriers associated with the operation of an out-of-hospital birth center and the opposition it faced by vested interest groups. Since CNMs are extensively used in these centers, these setting barriers also have an impact on the use of nonphysician practitioners.

Although many legal barriers can be noted, the ones that affect the practice of NPs, PAs, and CNMs the most are supervision requirements, prescriptive authority, and scope of practice. The supervision requirements determine whether a physician must be on-site, whether the nonphysician provider can practice at a site remote from the physician, whether the charts need to be reviewed by a physician, etc. For NPs, the issue is whether they can operate independently, but collaboratively, with a physician.

Nonphysician practitioners with prescriptive authority can practice more independently than those without the authorization to prescribe. For those who can prescribe medications, what they can prescribe is also important. They may be limited to noncontrolled drugs, drugs on a formulary, or be limited in some other way.

Which services practitioners can provide also affects the practice environment. The scope of practice may range from being very limited to expansive, depending on the state laws. Mandating that nonphysician practitioners have a limited scope of practice inhibits their utility and is likely to reduce their productivity.

Although the laws may be the same for urban and rural areas, they may have a greater impact on rural areas. That is, in rural areas where the overall demand for services is lower, it may be desirable for the nonphysician practitioner to operate at a remote site. If the laws or regulations require direct supervision, prohibit or severely restrict prescriptive authority, or severely limit the services that can be performed, then having nonphysicians practice at a remote site will not be feasible. If the nonphysician practitioner is working in a group practice, then the limitations imposed by the laws and regulations may have minimal impact since physicians will be readily available to approve or oversee their actions.

Because state laws and practices differ across the nation, the authority of the nonphysician practitioner can range from being treated essentially equivalent to a physician (as reported by Dr. Neal Vanselow at the meeting of the Workgroup on Primary Care Workforce Projections, 7 December 1994), to not being recognized as a provider, as is the case for PAs in Mississippi.

3.4 URBAN/RURAL DIFFERENCES

Socioeconomically and demographically, rural America differs in important ways from urban/suburban America (Harris and Leininger, 1993). The rural population tends to be older, poorer, less well-educated, and less well-insured. By definition, the population density is lower than that of urban areas. There are rural areas without any physicians and

those rural areas that do have physicians have a lower physician-to-population ratio than do urban areas. Rural physicians are organized into smaller groups, tend to spend less time with each patient, and see more patients per day than do their urban counterparts.

Of interest to this study is how the urban-rural differences affect the model for estimating the requirements for primary care providers. Because the rural population is older, poorer, and less insured, there is less of an economic incentive for physicians to practice in rural areas. Consequently, many of the health profession shortages are in rural areas. An alternative to using physicians is to call upon nonphysician practitioners to provide health care in rural areas; however, as stated above, the on-call requirements have implications for the minimum number of physicians serving an area. If all rural areas were to require (and have) at least four physicians, then the demand for practitioners would have to exceed what those four physicians could meet to warrant hiring a nonphysician practitioner.

To use more NPs and PAs in rural areas, particularly if they practice without a physician on-site, will require enactment of appropriate state laws and regulations governing supervision, prescriptive authority, and scope of practice, among others. As discussed above, such laws can profoundly affect the usefulness of these nonphysician practitioners in rural areas.

Apparently, the use of nonphysician practitioners in rural areas is acceptable to most of the population. According to the Rural Policy Research Institute (1994), a higher percentage of the rural population would find a PA acceptable than would an urban population. Furthermore, Ramsey, et. al., (1993) reported that satisfaction with NP managed care was rated as high by 97% of the clients.

It is not clear from the literature how the staffing pattern in rural areas should differ from that in urban areas except that groups will be smaller. The minimum number of physicians needed to provide safe and efficient on-call coverage would tend to increase the number of physicians in rural areas if the supply were sufficient. Alternatively, economic incentives for physicians, or the lack of them, suggest that the rural environment may be better suited to nonphysician practitioners. If demand is estimated regardless of supply, then it is not clear how rural practices will be staffed to meet this demand.

3.5 OFF-LOADING

3.5.1 Off-Loading Concept

In a presentation at the workgroup meeting in Maryland in December 1994, Dr. Vanselow reported on an HMO that was off-loading work to the lowest level of provider that could competently provide the service. He described concentric circles with specialists in the innermost circle, primary care physicians in the next circle, then nonphysician practitioners, registered nurses, etc. The concept was to move as much work as possible away from the center of the circle to less expensive providers. If a primary care physician could do the work, then a specialist should not. If an NP or PA could perform the task, then a primary care physician should not. The motivation behind the off-loading apparently was to provide services cost-effectively. What could be off-loaded depended on the competencies of the various practitioners. Such competencies may have been developed during the practitioners' basic educational preparation or during subsequent education and experience.

3.5.2 Service Allocation Among Practitioners

Who can provide which primary care services will be an important consideration in developing the model. (Implied in the discussion is that the quality of care will not diminish regardless of who provides the services.) Who can provide the services is assessed in the literature in two ways — by the services each type of practitioner is competent to provide and by the proportion of primary care services that the practitioner can perform.

Competencies vary not only among the different types of practitioners — i.e., among physicians, NPs, PAs, and CNMs — but also within each of these groups. For example, Rivo and colleagues (1994) identified the common presenting conditions and diagnoses that broadly trained, generalist physicians could be expected to manage in a primary care practice. After compiling a list of 60 requisite residency training components, they determined the extent to which residency training requirements for family practice, internal medicine, pediatrics, obstetrics and gynecology, and emergency medicine addressed these components. They found some differences. Because NPs are prepared in any one of multiple programs with different content, their competencies also differ; the case is similar for PAs and CNMs.

Comparisons among the different types of providers are more common than are assessments of a specific type of practitioner. The differences among the practitioners start with their educational preparation. Physicians and PAs are prepared under the biomedical model, whereas NPs and CNMs follow the nursing model of preparation, which focuses more on holistic care. Because of the differences in educational preparation, the services they provide may also vary in type or in emphasis. OTA (1986) reported that

PAs tend to focus more than NPs on providing acute care services. PAs place less emphasis on preventive services and provide selective patient services whereas NPs are oriented more toward treatment of the whole patient. PAs tend to function primarily as substitutes for physicians, generally providing only services that physicians provide, whereas NPs are likely to provide both services usually provided by the physicians as well as services generally provided by nurses (p. 40).

NPs tend to excel in health education, preventive health, counseling, follow-up care, and care for patients with chronic illness (Crosby, Ventura, and Feldman, 1987; Physician Payment Review Commission, 1991). PAs assist physicians with acute and chronic illnesses, but are also expected to be involved with many psychosocial problems (Blessing and Elizondo, 1990). Physicians are particularly well qualified to care for patients with complex illnesses, especially if they involve multiple systems.

As stated above, another way of assessing what the different types of providers can do is to determine the proportion of primary care services that can be performed by each. The studies usually address the proportion of primary care services that can be performed by NPs and PAs. It is generally assumed that primary care physicians can perform all primary care services — although not all primary care physicians are equally well prepared to provide all primary care services (Rivo, et. al., 1994). Also, there is some indication that some primary care services can be provided better by NPs, primarily those services that require communicating, counseling, and interviewing skills (OTA, 1986).

Apparently at least 80% of all primary care can be provided by NPs and PAs. Studies reviewed by OTA (1986) acknowledged that up to 90% of primary pediatric care and 80% of adult care could be provided by nonphysician practitioners. Record (1981), after reviewing existing information, suggested that 80% of the outpatient visits in adult primary care, and somewhat more in pediatric care, might be safely delegated to nonphysician providers. More recently, Hooker and Freeborn (1991) reported that PAs are capable of providing care for 86%

of the diagnoses seen in outpatient primary care settings and that patient acceptance is high. The lowest estimates of the proportion of primary care services that can be performed by nonphysician practitioners are about 50%. It should be remembered, however, that many of the conclusions about the proportion of primary care services that can be provided by PAs and NPs are based on data that were obtained during the 1970s or early 1980s. Over time the educational preparation of NPs and PAs has improved, suggesting that present NPs and PAs are more competent than their predecessors. The survey of Certified Nurse Practitioners and Clinical Nurse Specialists indicates the tasks and functions that are performed by NPs and the autonomy with which they are performed. The results suggest that NPs perform many ambulatory tasks and functions at a high level of autonomy. Dr. Vanselow, in a recent visit to an HMO, was told that nonphysician practitioners were considered primary care providers and had their own patient load. The NPs and PAs would consult or make referrals to physicians when the presenting problems were not within their competencies.

In summary, the literature indicates that NPs and PAs can perform a large proportion of primary care services, maybe as much as 80 to 90%. Primary care physicians are better prepared to manage complex cases, particularly those involving multiple systems, whereas NPs excel in providing preventive care, counseling, patient education, and care for chronically ill patients. PAs can perform many of the same functions as physicians, including providing preventive services, counseling, and patient education.

3.5.3 Services Provided by Certified Nurse Midwives

Although the quality of care rendered by CNMs is documented, there is a sparsity of studies on the proportion of services they can provide. According to the American College of Nurse Midwives (1993), nurse-midwifery practices include services to healthy women and their babies in the areas of:

- prenatal care;
- labor and delivery management;
- postpartum care;
- well-women gynecology;
- normal newborn care;
- family planning;
- prescriptions;
- preconception care; and
- counseling in health promotion and disease prevention.

In general, we found no information on the extent that these services can be, or are, provided. The Kaiser Foundation (1992) indicated that 70% of low-risk births at one of its HMOs were managed by CNMs. This is much higher than average, since less than 5% of all US births are attended by CNMs (National Commission on Nurse-Midwifery Education, 1993). Based on the limited data, it appears that much greater use could be made of CNMs in low-risk delivery and potentially other areas of care that CNMs cover.

3.5.4 Categorization of Services

Services need to be categorized in the model only to the extent required to differentiate among the services rendered by the different types of practitioners. Obviously, primary care services need to be separated into maternity and nonmaternity services. The appropriate categories for maternity care appear to be low- and high-risk deliveries. Whether the other services provided by CNMs should be incorporated into the model is unclear at this time.

Many schemes are available for classifying nonmaternity services. These include: the International Classification of Disease (ICD) codes, Internal Classification of Primary Care (ICPC) codes, and physicians' Current Procedural Terminology (CPT) codes. These codes would need to be aggregated into categories relevant to this study.

One possible classification scheme was devised by Schneeweiss and Hart (1988), who established diagnostic clusters that were derived from National Ambulatory Medical Care Surveys. These data coded diagnoses with ICDA-8. The 27 primary care clusters they developed were further aggregated into acute disease; chronic disease; depression, anxiety, and neuroses; and general medical examination/well care.

Another method for categorizing the services is to use the scope of practices included in many of the NP and PA practice acts or regulations. These acts and regulations delineate what the NPs and PAs can do. There are two weaknesses associated with using these codes, however. One, they are not uniform across the states; and two, they are often oriented toward procedure, not diagnosis. Consequently, the scope of practices would be difficult to relate to demand, which tends to focus on illness or wellness.

Other activities and studies have been (or are being) undertaken that have categorized competencies or services. OTA, for example, is studying the medical workforce. They have listed 15 services and activities associated with primary care. These categories are:

- preventive care/screening;
- physical examinations;
- medical history taking;
- basic diagnostic testing;
- diagnosis and treatment of common physical and mental conditions;
- prescribing/managing medication therapy;
- care of minor injuries;
- education and counseling on health and nutrition issues;
- minor surgery/assisting at surgery;
- prenatal care/delivery of normal pregnancies;
- well-baby care;
- continuing care/management of chronic conditions;
- referral to and coordination of specialty care;
- nursing and geriatric care; and
- emergent care.

The appeal of this list is that different practitioners would excel at providing certain listed services. CNMs obviously would excel in prenatal care and delivery of normal pregnancies. PAs would be better prepared than NPs or CNMs to undertake minor surgery and to assist at surgery. The services provided by NPs would include prevention, screening, education, and counseling on health and nutrition issues. These nonphysician practitioners would also provide other services on the list, as well as sharing with other practitioners in providing most of the services.

Still other categories would include the list of core competencies being developed by the National Council of State Boards of Nursing, the categories developed by Rivo and colleagues that were discussed earlier, and primary care categories used by other researchers. Many of these would not be particularly relevant to this study, either because they could not be related to demand or because they would not differentiate among the practitioners' services.

Presently, the OTA list of the diagnostic clusters developed by Schneeweiss and Hart appear to be the most suitable for the purposes of our model.

3.6 BURNOUT

The literature addresses two issues regarding staffing patterns and physician burnout. First, as mentioned above, if the number of physicians is insufficient to provide adequate on-call coverage, then physician burnout may occur.

The other issue is associated with off-loading. The concern is that staffing patterns will be established whereby primary care physicians will diagnose and treat only complicated cases and that this intense level of care may result in burnout. The point is that the level of off-loading may be limited by factors other than what duties nonphysician providers can satisfactorily perform.

4.0 PRODUCTIVITY

4.1 MEASURES OF PRODUCTIVITY

The literature refers to three ways productivity is measured — time per visit (Greenfield et. al., 1978; Mendenhall, Repicky, and Neville, 1980; Record and Greenlick, 1975; and Zapka and Kennedy, 1986); number of visits per unit time (Camasso and Camasso, 1994; Jones and Cawley, 1994; Mendenhall, Repicky, and Neville, 1980; and Nelson, et. al., 1975); and practice productivity (Hershey and Kropp, 1979; Holmes, et. al., 1977; Holmes, Livingston, and Mills, 1976; and Nelson, et. al., 1975). Productivity is also measured on a population base, i.e., the number of practitioners required per 100,000 population (Weiner, 1994).

Time per visit may be assessed in several ways. It could be the time allocated for the patient visit (Washington Consulting Group, 1994), the time the practitioner is with the patient, or the total amount of the practitioner's time consumed by the patient's visit — including contact time, time required to enter information into the patient's record, consultation time, and time required to check on laboratory results. Several weaknesses are associated with the time-per-visit measure. One of these is the ability to assess how much of the practitioner's time is really associated with the visit. Measuring just the contact time will result in an overestimation of the practitioner's productivity, for example. Yet obtaining data on all the time associated with a patient's visit is difficult because of the way that many practitioners intermingle activities with several patients.

Measuring the number of visits per unit time overcomes some of these measurement problems. Visits per unit time incorporates not only all the time associated with caring for the patient, but also other time expended by the practitioner. For us to use this measure in the model, decisions would need to be made on whether some non-patient-related activities, and their associated time, should be excluded from the measure. For example, should time spent in staff meetings, at national conferences, and in continuing education be included in the measure of productivity? If activities such as these that may occur only weekly, monthly, or annually are included in the productivity measure, then the measurement period must be sufficiently long so the occurrence (or non-occurrence) during the observation period does not bias the results.

Also, consideration would need to be given to how the time unit is defined and how it should be extrapolated to a longer time period. For example, if the data that are to be used are in different units of time, then it will be necessary to develop conversion rates to change them to a standard unit of time. Does one use 8 hours/day, 5 days/week, 21 days/month, or are there more appropriate units?

Measures of an individual's productivity, be they time per visit or visits per unit time, do not consider the impact that one practitioner's efforts may have on another's. For example, given two practitioners, one who is a supervisor and one who is not, the productivity of the supervising practitioner will be lower according to this measure. Therefore, the productivity of both practitioners must be considered in assessing overall productivity. In addition, a practitioner's productivity may be a function of the amount of work that is delegated to another person. For example, if a physician delegates tasks to an RN, whereas an NP serves as both a practitioner and a nurse, the physician's productivity on a time-per-visit or visits-per-day measure will be higher; however, the impact on the practice is not clear. To overcome these problems, a measure of practice productivity may be appropriate. The measure is usually the increase in the number of patients that can be seen when a nonphysician practitioner is added.

The population-based measure of the number of practitioners per 100,000 population is generally associated with an HMO or another type of managed care practice where the covered population is defined. Differences in this measure can reflect differences in productivity of the providers or differences in the population being served. To use this measure requires establishing the characteristics of the population.

What the single most appropriate measure might be is not clear. It may be different for different sectors. For example, for group and staff HMOs, the most appropriate measure appears to be the number of practitioners per 100,000 population. This measure could be extended to other sectors in a manner similar to that used by Weiner (1994). He applied this measure not only to the staff/group model HMOs but also to integrated networks, managed FFS plans, and open FFS sectors. This appears to be a reasonable approach, but thought should be given to alternative approaches, as well as to identifying the weaknesses of the approach used by Weiner.

4.2 PRACTITIONERS' PRODUCTIVITY

OTA (1986) summarized that "productivity studies indicate that NPs and PAs working under physician supervision can increase total practice output by some 20%-50%" (p. 6). The report further stated that "although much less information on productivity is available for CNMs...the degree to which CNMs can substitute for physicians appears to be considerable" (p. 6).

As indicated earlier, productivity can be measured in four ways. The OTA results just cited focus on practice productivity. A summary of the data related to each of the other types of measures is presented below.

The information we looked at, much of which was addressed by OTA, indicated that the amount of time a practitioner spent with a patient was about 10.5 minutes for physicians (range 8.9 to 11.8), 10.2 minutes for PAs (range 7.1 to 13.3), and 17.3 minutes for NPs (range 15.3 to 19.4) [Greenfield, et. al., 1978; Mendenhall, Repicky, and Neville, 1980; Record and Greenlick, 1975; and Zapka and Kennedy, 1986]. These values are averages of the data in the studies we reviewed. Since not all the studies addressed all three types of practitioner, the average values may reflect the variability among the studies. For the one study that included all three types of practitioners, physicians were the most productive (11 minutes with patient), PAs the next most productive (13.3 minutes with patient), and then NPs (19.4 minutes with patient). In all the studies it is not clear whether they were performing the same activities, or how much was being delegated to others.

The information on visits per unit time was in both visits per day and visits per hour. Since the length of the day is not known, we did not make the conversion. On a per day basis, the numbers of visits were 21.4 and 21.6 for physicians, 14.2 and 22.1 for PAs, and 7.9 for NPs (Jones and Cawley, 1994; Mendenhall, Repicky, and Neville, 1980; and Nelson, et. al., 1975). On an hourly basis, the values were 2.2 and 3.6 for physicians and 1.8 for NPs (Camasso and Camasso, 1994; University of North Carolina, 1985). We did not have any values for PAs on an hourly basis.

Regarding the 3.6 visits per hour, Camasso and Camasso (1994) found that the quality of care appeared to decrease when the number of visits per hour exceeded 3. Apparently fewer immunizations were administered; sparser medical histories were taken; and for female patients, fewer preventive procedures were undertaken when the number of visits reached this level. Thus, there appears to be an upper limit to productivity that can be achieved before it starts to affect the quality of care that is provided.

Weiner (1994) brought together much of the physician data that were available on the number of practitioners per 100,000 population. He used data primarily from HMOs, adjusting the HMO data for differences in demographics for other populations, for out-of-plan use, and for expected differences in productivity for physicians practicing with different income incentives. His adjusted values for the number of primary care physicians per 100,000 were 65.9 for staff/group model HMOs, 55.9 for integrated networks, 61.6 for managed FFS, and 64.8 for open FFS. These were for metropolitan areas. He found 55.9/100,000 population for rural areas. It appears that his estimate for rural areas was based on supply-side considerations. The 1992 US supply of primary care physicians was reported by Weiner to be 65.7/100,000 people.

Weiner also reported the 1992 supply of NPs, PAs, and CNMs combined to be 19.6/100,000 population. GHAA (1993) reported that the median number of PAs per 100,000 in group HMOs was 13; NPs, 8; and nurse midwives, 14. Because these are medians and not averages, it is not appropriate to total the values to compare to the US number; however, the numbers indicate that nonphysicians are used much more frequently in group model HMOs than in other types of practices.

4.3 FACTORS AFFECTING PRODUCTIVITY

Although the literature on this topic is not extensive, productivity may be influenced by several different factors. These are briefly discussed below.

4.3.1 Group Size

Group practices are reportedly more productive than solo practices (Hurdle and Pope, 1989). However, small groups appear to be more productive than large groups. The Hurdle and Pope study found that groups of 2 to 4 physicians completed 13% more total visits per year than did solo practices; physicians in groups of 5 to 9 completed 22% more visits; and physicians in larger groups completed 12% more visits.

4.3.2 Income Incentives

Physicians working in an FFS environment are apparently more productive than salaried physicians (Hurdle and Pope, 1989; Weiner, 1994). The number of hours worked

per week and the number of patients seen per hour are reported to be higher for self-employed physicians compensated on a fee-for-service basis than for salaried physicians (Luft, 1981).

4.3.3 Delegatory Style Within Physician Office

Tahir (1976) concluded that efficient utilization of pediatric nurse practitioners depends to a large extent on the degree of task delegation. The more tasks that are delegated, the more efficient is the NP. During discussions at the December 1994 meeting of the Workgroup on Primary Care Workforce Projections, Dr. David Kindig put it another way. He suggested that for nonphysician practitioners to be productive, a cluster of interrelated tasks must be delegated. This finding implies that at least a minimum amount of primary care services must be delegated for nonphysician practitioners to be productive, and that these tasks should be compatible.

4.3.4 Setting Influence on Productivity

We have already mentioned the effects that group practice and income incentives (HMO vs. FFS) have on productivity. In addition to these common practice arrangements, there are free-standing birth centers and independent practicing NPs. Although these types of practices currently account for only a small proportion of services that are provided, they appear to be an emerging trend. The questions are, how efficient are these independent operations, and what impact do they have on overall productivity? During the December 1994 Workgroup meeting, Dr. Ruth Lubic contended that the independent birth centers provide quality care for low-risk deliveries and that this care is highly productive. Presently there is very little information on the productivity of these independent operations, so little can be concluded.

5.0 COST EFFECTIVENESS

OTA's summary (1986) states that

hiring an NP, PA, or CNM increases a practice's total output and costs less than employing an additional physician. Because training is less costly for these practitioners than for physicians, using NPs, PAs, and CNMs rather than physicians for certain services would presumably be cost-effective from a societal point of view, given that the quality of care is equivalent to that provided by physicians for comparable services (p. 49).

The few studies or assessments that have been undertaken since the OTA analysis tend to support the OTA findings (Burg, 1990; Hirsh, 1991; McGrath, 1990).

Although the evidence supports the cost effectiveness of nonphysician practitioners, there is uncertainty about the results because the issue is complex and most of the data is out-of-date. The uncertainty has more to do with the cost side than with the effectiveness/quality side of the equation. As stated earlier, the quality of care provided by the nonphysician practitioners appears to be as good, within their areas of competency, as that provided by physicians.

The cost-effectiveness studies we reviewed generally used productivity rates and other information from the studies conducted during the 1970s or early 1980s. Whether these values are still relevant is unknown. There was also uncertainty in these older studies as to whether the different types of practitioners were providing similar services; thus, the productivity differences that were detected could have been, at least in part, due to differences in the services provided. With the NPs and PAs now receiving more preparation than they did during the early years, and the physicians' practices being more experienced in using nonphysician practitioners, it is reasonable to expect the nonphysician practitioners' productivity to have improved at least in some settings.

The impact of using nonphysicians on the physician's productivity is not clear. Is the supervising physician's productivity reduced, and if it is, as evidence seems to indicate, is it because of time spent supervising the nonphysician provider or because of the flexibility to work fewer hours? In a related issue, how many hours per year do nonphysician practitioners and physicians spend in providing patient care services? There are also issues of whether nonphysicians request fewer or more x-rays, prescriptions, laboratory workups, etc., than do physicians.

Salary is one consideration, and possibly the most important one, in determining the cost effectiveness of nonphysician practitioners and physicians. The salaries of nonphysician providers are less than for physicians; however, if services provided by nonphysicians are charged at the same rate as for physicians, then the societal cost may not reflect the lower cost even though the practice will realize the benefit. If nonphysician practitioners receive the same pay as physicians do for the same work, then there will not be a cost saving due to salary.

In addition to the cost associated with providing patient services, there is also the cost of the practitioner's educational preparation. This is an important aspect of the cost-effectiveness formula from a societal perspective. Physicians' preparation costs more than that of the nonphysician practitioner, so all else being equal, nonphysician practitioners would be more cost effective.

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Part II:
Primary Care Services
Demand And Health Care
Reform Scenarios

6.0 PRIMARY CARE SERVICE REQUIREMENTS

In reviewing the literature on primary care service requirements, we examined definitions of primary care and both the observed demand and need for primary care services. Demand, in our use of the term, is a different concept than a clinical assessment of the “need” for primary care services. Demand is a function of a combination of factors that result in a certain level of primary care services utilized and provided. Need is the level of primary care services that would be provided given the health status of the population absent affordability, availability, and other barriers to accessing care. A major goal of the modeling effort is to go beyond a narrow demand definition to incorporate elements of need.

Discussion begins with the problem of defining primary care. Next, factors affecting the demand for primary care are addressed. The chapter concludes with a section on the incorporation of elements of need.

6.1 DEFINITIONS OF PRIMARY CARE

In order to quantify the use of primary care services, one must first define primary care. Very little consensus exists on the definition of primary care. It can be defined based on the type of provider seen, as an orientation to providing care, or based on specific types of services and care provided.

The current Assistant Secretary for Health, Dr. Philip R. Lee, provided the following five views of primary care during the 1992 National Primary Care Conference sponsored by the Health Resources and Services Administration (HRSA) [see Health Resources Service Administration, 1992]:

- **A set of activities** where specific functions define the boundaries of primary care (e.g., curing or alleviating common illnesses and disabilities).
- **A process** that matches the needs of the individual with an appropriate mix of health services that are coordinated over time.
- **A level of care** that is the first point of contact for preventive care, diagnostic treatments, and rehabilitative services for both acute short-term and chronic long-term illnesses and injuries.

- **A strategy** for organizing the health care system as a whole based on an ideological model that gives top priority to a community-based, anticipatory approach.
- **A philosophy** that is characterized by social justice, equity, and a sharing of decision making power with communities and patients themselves.

The Institute of Medicine (IOM) began a study of primary care in March 1994, and released an initial report with a definition of primary care (see Donaldson, et. al., 1994). The IOM definition of primary care is “the provision of integrated, accessible health care services by clinicians who are accountable for addressing a large majority of personal health care needs, developing a sustained partnership with patients, and practicing in the context of family and community.”

Barbara Starfield, in a discussion piece entitled “Primary Care in the United States,” summarized past commission deliberations with a definition of primary care similar to the IOM’s. The concept and intent of primary care can be defined as first contact care, comprehensive care, coordinated (or integrated) care, and care that has continuity over time (see Starfield, 1986).

Starfield also identifies the major difficulty with definitions of primary care such as those outlined above. These definitions provide a general understanding of the meaning of the term, but have limited utility in the translation to a measurable phenomena. She goes on to cite an analysis of the National Ambulatory Medical Care Survey (NAMCS) that showed that primary care practices do not have a larger percentage of visits for preventive care than other physicians. The percentage of visits that are unrelated to symptoms varied from 1.8% for otolaryngologists to 61.4% for obstetrician-gynecologists, with 8.6% for internists and 12.1% for generalists (see Puskin, 1977).

In order to gain an accurate measure of the continuity, comprehensiveness, first contact, coordination, and community orientation components of primary care, interviews with both providers and patients, as well as medical record audits would have to be conducted (see Starfield, 1986). In the absence of this type of analysis, some researchers have attempted to identify specific activities and competencies that define primary care. A forthcoming report by the Office of Technology Assessment (OTA) will identify the following task areas as comprising primary care:

- preventive care/screening;
- physical examinations;
- medical history taking;
- basic diagnostic testing;
- diagnosis and treatment of common physical and mental conditions;
- prescribing/managing medication therapy;
- care of minor injuries;
- education and counseling on health and nutrition issues;
- minor surgery/assisting at surgery;
- prenatal care/delivery of normal pregnancies;
- well-baby care;
- continuing care/management of chronic conditions;
- referral to and coordination of specialty care;
- nursing and geriatric care; and
- emergent care.

In a study of the training requirements of a generalist physician, Rivo, et. al., identified 60 training components that included the following major headings (see Rivo, 1994):

- care for a broad spectrum of the population (e.g., newborns, adolescents, and elderly);
- care of patients in multiple settings (e.g., ambulatory, hospital, home, and nursing home);
- comprehensive preventive care, including counseling, screening, and immunizations;
- treatment of common acute illnesses (e.g., otitis media and pneumonia);
- on-going treatment of common chronic conditions (e.g., diabetes, hypertension, and acne);
- on-going treatment of common behavioral problems, including depression and substance abuse; and
- other training for generalist practice, including community/public health, use of community services, and patient education.

Primary care can be defined simply as those services which primary care practitioners (family and general practitioners, internists, pediatricians, obstetricians/gynecologists, nurse midwives, and nurse practitioners) provide. However, some of the services provided by these practitioners are also provided by specialists (e.g., assessment of chest or back pain). Hence, there is overlap. Moreover, medical services or procedures that might generally be considered in the realm of specialists under one scenario might be primary care under another. Basic tests and X-rays currently being provided by specialists because they were the point-of-entry into the health care system, for example, may be performed by primary care health professionals under an alternative delivery system (e.g., a gatekeeper model). Therefore, it will be important to understand the population served and the practice standards for the particular provider to population ratios considered for the modeling effort.

Current classification schemes are insufficient to capture what might be considered primary care, in part because there is a lack of consensus on the definition of primary care. Therefore, if this avenue is pursued, it is important to agree upon an operational classification for types of services that will be considered primary care.

6.2 FACTORS AFFECTING THE DEMAND FOR PRIMARY CARE

Demand for health care services can be described as resulting from a combination of:

- The underlying health status of the population as reflected in the incidence of disease and injury — Health status determines the level of need for primary care and can be affected by both genetic influences (e.g., diabetes) and behavioral choices (e.g., lung cancer associated with smoking). Certain demographic characteristics may be correlated with health status; for example: age, gender, and race/ethnicity.
- The affordability of primary care — Affordability is a function of the combination of the income of the population and the prices faced for care. The prices faced for care, or the “effective” price of services, are a function of the extent of insurance coverage and the charges of providers.

- The availability of primary care and the health care delivery system — Although availability of primary care is primarily a function of the supply of health professionals able to provide the care, supply has a concurrent effect on demand. For example, observed demand for primary care services in some areas may be particularly low because there is inadequate capacity to serve the population. Availability is also a function of the incentives faced by providers in the treatment of patients or the organization of the health care delivery system. Primary care health professionals often serve as an “agent” for the patient in determining what primary care services should be consumed. Hence, the incentives faced by the primary care providers will, to an extent, determine the effective demand for services.
- Perceived need for and barriers to primary care — In addition to health status and the ability to afford care, an individual’s perceived need for, and any barriers to, care will also influence his or her demand for care. Particularly for primary care, perceived need is an important factor, because many of the services that might be considered primary care (e.g., immunizations and screening) are not associated with a condition or presenting symptoms that might prompt an individual to seek care. Instead, whether individuals seek these types of services has more to do with the extent of their knowledge about appropriate primary care services. Barriers to primary care can come in many forms, including physical access and cultural considerations as to whether the care is acceptable.

The different aspects described above have interactive effects with other factors. For example, health status can affect the affordability of care in several ways. Health status can have an effect on one’s earning potential and, thus, resources available to purchase primary care. Health status can also have an effect on one’s ability to obtain health insurance, which in turn influences the price a consumer faces for primary care. We consider the independent effect of each factor to the extent that the methodology of each study included the factors considered. For example, the effect of health status, holding income and prices constant.

For purposes of this literature review, we have divided factors that affect primary care demand into two broad categories — those factors which are determined by the healthcare delivery system (i.e., the “effective” price of services and accessibility to services), and those factors which are beyond the control of the healthcare delivery system (i.e., the socioeconomic and demographic makeup of the general population, and the general level of

health in the population).¹ We note that the empirical findings cited in this section do not always specifically refer to primary care, but more often are based on estimates of the demand for health care services in general.

In this review, we summarize findings from the literature on how characteristics of the healthcare delivery system and socioeconomic and demographic characteristics of the general population affect the demand for primary care services. The demand portion of the integrated primary care requirements model will combine information about demographic changes in the general population over time (e.g., the aging of the population) and changes in the healthcare delivery system (e.g., the trend from fee-for-service to managed care), and in conjunction with productivity and staffing information, provide policy makers with forecasts to plan for the adequacy of the supply of primary care providers to meet the demands and the needs of the population.

6.2.1 Factors Related to the Healthcare Delivery System

Researchers have attempted to identify differences in pricing schemes and practice methods across insurance settings to identify factors that affect health services utilization. Analyses of these pricing and practice differences across insurance settings have found that individuals (both consumers and healthcare providers) respond to incentives to change utilization behavior. Such analyses are difficult to perform because of the complex nature of human behavior, the multitude of perverse incentives existing in the current market, and the large number of factors influencing behavior, only some of which can be captured in the analysis. For example, a person's insurance status (both whether or not he/she is insured and the type of insurance plan he/she has) will affect his/her demand for health care

¹Many of the studies referred to in this report include a health-status variable in their econometric model. This health-status variable is usually the sample participant's response to a question asking if his or her health is excellent, good, fair, or poor. Every study which includes a health-status variable finds that a person's level of health is a major determinant of that individual's demand for health care (see, for example, Witsberger, 1993).

services.² Likewise, a person's demand for health care services will affect his/her decision to buy insurance and the type of plan purchased.

Before discussing the literature findings on the health care delivery system and the effective price of services, we would like to provide some common definitions and terminology for types of insurance coverage. The healthcare delivery system has traditionally been a fee-for-service (FFS) setting, where individuals can choose to purchase insurance (or qualify for government-funded insurance), and insurers pick up a high proportion of the total cost of health services used. Under this system, neither the insured individual nor the health care provider has an incentive to limit the use of services to the point where the cost of an additional visit or procedure equals the value of the service to the patient. The only cost of additional service to the insured individual is his/her time and a typically modest copayment, so individuals face a low "effective" price for service. This often results in the individual using more services than he/she would under a system where he/she had to pay the full cost of services. Likewise, the provider has little incentive to withhold services that might provide marginal benefits to the patient because a third party (the insurer) will reimburse the provider at some reasonable rate for services rendered.

The rapid increase in health care costs has prompted insurers to search for new ways to ensure that utilization decisions more accurately reflect the interest of the payer. The result has been new health care management and delivery systems, which attempt to make insured individuals and healthcare providers more responsive to the cost of service. These new health care management and delivery systems have resulted in an alphabet soup of different types of insurance coverage. The different types of insurance coverage can be distinguished based on the degree to which the intermediary and the delivery system are integrated. The intermediary is the entity that bears the financial risk of the insured population demanding more or less service than the premium charge assumes. The delivery system can be thought of in terms of the structure of the system (i.e., the degree of horizontal and vertical integration of providers into networks) and the degree to which care is managed (i.e., the formal mechanisms in place to monitor and influence the use of care). Some of the distinctions among plans also are based on benefit design features.

²Insurance will, in general, lower the "effective price" to the individual of a particular health care service inducing a greater amount demanded, other things being equal.

As discussed above, traditionally, the intermediary was a large insurance company or a large self-insured employer that paid providers based on charges per service with very little oversight of the care patients sought. With the advent of staff/group model health maintenance organizations (HMOs), the intermediary both bore the risk and delivered the care. More recently, variations between fee-for-service intermediary arrangements and staff/group model HMOs have developed. Intermediaries have begun to share the risk of providing care with the providers of care, generally hospitals and physicians. Below we define the most common terms used currently to describe different types of insurance based on the degree to which the intermediary and the delivery system are integrated.

- **Fee-for-Service (FFS)** — The intermediary is generally an insurance company or a large, self-insured employer³ that pays providers based on charges per service or a fee schedule with very little oversight of the care patients sought.
- **Managed Fee-for-Service (MFFS)** — The intermediary is also generally an insurance or a large self-insured employer paying providers on a fee-for-service basis, but the insurance plan includes limited management of care, such as requiring prior authorization for non-emergency hospital admissions and elective surgeries and post-utilization review of certain types of care to identify patterns of inappropriate use of care (e.g., mental health care and prescription medications).
- **Preferred Provider Organization (PPO)** — The intermediary for a PPO is generally an insurance company or a self-insured employer contracting with an established network or an assortment of individual providers. Providers within the network are paid based on a negotiated fee schedule which usually constitutes a substantial discount from usual charges. In a PPO, plan enrollees receive reduced cost-sharing requirements in exchange for seeking care from a provider participating in the designated network and often do not have to file claims for services provided by a network provider. PPOs generally include the prior-authorization and utilization review features discussed under managed FFS. In addition, the intermediary may engage in some statistical measurement of provider performance.

³Self-insured employers are employers that pay for employees and their dependents' health care costs out of the company's funds rather than paying a premium to an insurance company. Self-insured employers generally bear the entire risk of health care costs. Self-insured employers often purchase stop-loss insurance that reduces their risk if an individual employee exceeds the stop-loss level or the group in the aggregate exceeds a specified stop-loss level.

- **Point of Service (POS) Plan** — A POS plan has been described as a hybrid of HMOs and PPOs. It is more a benefit plan design than a specific financial arrangement or delivery arrangement. The intermediary contracts with a network of participating providers either on a fee-for-service basis that generally includes financial incentives for providers to avoid over-utilization or on a capitated basis. Enrollees typically select a primary care physician, who controls referral for medical specialists. Enrollees pay little or nothing out-of-pocket and do not have to file a claim for care received from a plan provider. Care provided by out-of-plan providers (and sometimes care from in-plan specialists received without a primary care provider referral) is reimbursed, but enrollees must pay significantly higher copayments and deductibles.
- **Individual Practice Association (IPA)/Network HMO** — In this model, intermediaries contract with individual physicians in independent practice or with associations of independent physicians to provide services to plan members at a negotiated rate per capita, a flat retainer, or a negotiated fee-for-service rate. Network models are similar in that the intermediary contracts with two or more independent (single- or multi-specialty) group practices. The intermediary may or may not own or control the IPA or network and, as outlined above, the providers may or may not share in the financial risk of providing care. Physicians maintain their own offices and see other non-enrolled patients on a fee-for-service basis, while contracting with one or more plans. The non-exclusivity of the providers to the intermediary reduces the influence the intermediary can bring to bear on the providers.
- **Group/Staff Model HMO** — Group model HMOs are distinguished by an exclusive arrangement between the intermediary and a physician group. The physician group is paid on a negotiated per capita rate and the group then distributes the funding among individual physicians, typically by salary. In a staff model HMO, the intermediary directly employs providers and usually pays the individual providers a salary. Many plans also include bonus incentives for individual physicians' favorable utilization.

Discussion now turns to those aspects of the healthcare delivery system that impact the demand for primary care services.

6.2.1.1 Insurance Coverage

Uninsured individuals are charged the full price of health services. This creates a strong incentive to limit their use of services to the point that their out-of-pocket costs equal the value of the benefits they expect to gain from visiting a healthcare provider or receiving

any healthcare services.⁴ Numerous studies have found significant differences in health care utilization between the insured and uninsured. Researchers have determined that much of this variation can be attributed to differences in the demographic makeup of the insured and uninsured populations; however, after holding population characteristics constant across insurance status, significant differences in health services utilization remain. Outpatient visits for the uninsured have been estimated to be lower than outpatient visits by the insured by 26% (Freeman, 1990), 19-27% (Freeman, 1987), 25-37% (Long, 1989), 36% (USCRS, 1988), 21% (Rowland, 1989) 32% (Long, 1985), and 35% (Davis, 1983).⁵

Several trends could possibly affect the percent of the population covered by insurance, and, therefore, demand for primary care services. First, the federal government and various state governments have given some consideration to plans which would guarantee universal insurance coverage. Weiner (1993) predicts that covering all the uninsured would increase demand for primary care services by 13-15%, depending on the assumptions made about the utilization patterns of the currently uninsured. Second, during the past decade insurance premiums have rapidly increased to keep up with the increase in health care costs. Between 1987 and 1992, insurance premiums increased 62% in real dollars. During this same interval, the percentage of the population privately insured fell by 5.8%.⁶ If premiums continue to rise, one would expect demand for primary care services to fall because consumers will be less likely to purchase insurance, and/or they will be

⁴Although uninsured individuals are charged the full price of services, healthcare providers are not always able to collect the full amount of the bill. Individuals who seek healthcare services but have no intent to pay their bill would, arguably, not be cost-conscious users of healthcare services.

⁵While most of these studies control for other variables which affect the use of health services (e.g., age, sex, income, etc.), their models differ depending on the data made available to the researchers.

⁶Increases in insurance premiums are not the only cause for the decline in the percentage of the population covered by private insurance. Changes in the workforce and changes in the economy also affect insurance coverage.

more likely to limit purchases to policies with less generous benefits (i.e., plans that have higher levels of cost sharing).

6.2.1.2 Cost Sharing

Historically, insured individuals and health care providers have had little incentive to restrict the use of health care services to the point where the marginal benefit of an extra procedure or visit equaled the cost of providing that service. With a third party (the insurance company) footing nearly the entire bill, insured individuals reacted to health care services as if they were free goods. In an attempt to cut back on unnecessary utilization, insurers have devised methods that make enrollees in an insurance plan and health care providers more responsive to the cost of service. Cost-sharing policies which attempt to make customers more responsive to the cost of service usually take the form of a copayment (in managed care organizations) and coinsurance and/or a deductible (in a fee-for-service setting). The following table lists average cost sharing expenses by type of plan.

Cost Sharing Policies and Charges by Type of Insurance, 1989

Policies	Conventional	PPO	IPA-HMO	Staff/group-HMO
Mean deductible - individual	\$187	\$114	0	0
Mean Deductible - family	\$398	\$242	0	0
Coinsurance rate - preferred provider (percent of providers in this range)	0-20 % (88 %)	0-20 % (95 %)	NA	NA
Coinsurance rate - nonpreferred provider	NA	0-20 % (75 %)	NA	NA
Copayment	NA	NA	\$0-\$10 (75 %)	\$0-\$10 (87 %)

Source: HIAA Employer Survey, 1989. Means are averaged across employers, not across individuals.

Empirical studies have determined that cost sharing does dramatically reduce the use of some services.⁷ Manning, et. al., (1987) found that the average number of face-to-face visits per capita was 4.55 per year under a FFS plan with no coinsurance or deductible, 3.33 visits with 25% coinsurance, 3.03 visits with 50% coinsurance, and 2.73 visits when there was 95% coinsurance. Furthermore, the deterrent effect of cost sharing was inversely related to family income. Newhouse, et. al., (1982) obtained similar results. They found that as cost sharing declines, both the percentage of individuals seeking care and the number of ambulatory visits per user rise. They conclude that if cost sharing is income-related, it will cause approximately equiproportionate reductions in use among different income groups. The following table summarizes the findings from these case studies.

Case Studies of the Effects of Copayments on Demand for Health Care Services: Approximate Increase (+) or Decrease (-) in Physician Contacts Relative to the Previous Situation

Factor	Population in Study	All MDs	All PCPs ¹	Source
Copayments ranging from \$5 to \$20	HMOs with high and low option plans	0 to -25%		Greenwood and Stewart, 1993
Instituted \$5 copayment	Non-Medicare State of Washington employees	-8 %	-11 %	Cherkin, et. al., 1989
Instituted \$5 copayment and \$100 max deductible	Non-Medicare miners, retired before 1976 and their dependents	- 30 % yr 1, slight rebound in yr 2		Roddy, et. al., 1986
Co-insurance: 25% 50% 95%	Random sample of the general population; the RAND Health Insurance Experiment, 1974-1977		-37 % -50 % -67 %	Manning, et. al., 1987

¹PCPs = Primary Care Physicians.

⁷As discussed earlier, individuals will purchase an insurance plan based on their expected utilization of services. Individuals who expect to have low rates of utilization will tend to purchase plans that have lower premiums and higher levels of cost sharing. Consequently, an important methodological consideration in these studies is the degree to which the studies control for self-selection. Failure to do so will result in biased estimates of the effect of cost-sharing policies on demand for health care.

Although cost sharing lowers the quantity of health services demanded by raising the “effective” price of services, skeptics of these pricing schemes argue that those services that consumers are most likely to forego are preventive care services, which consumers may view as “optional”. Consequently, skeptics of cost-sharing policies believe that cost sharing will not achieve the expected level of savings because individuals will wait too long to seek treatment (which means they might require more expensive services at a later date).

Manning, et. al., (1984) found that in a controlled trial with comparable patients (receiving comparable benefits), HMO enrollees had about 30% more preventive care visits than did persons with free care in an FFS setting. However, the difference between preventive care visits in the HMO setting and in the FFS setting with a typical rate of cost sharing was over 70%. Valdez, et. al., (1989) found that face-to-face visits per child were the same in an FFS setting, regardless of the coinsurance amount (0%, 25%, 95%), but “preventive” visits per child were higher when there was no cost sharing (0.46 visits vs. 0.36 visits).⁸ Furthermore, Lohr, et. al., (1986) found that both children and adults had significantly lower rates of general medical examinations under a cost-sharing plan than those individuals in a controlled experiment who were randomly selected to receive free care in an FFS setting.

A natural experiment which allowed researchers to analyze the effect of copayments on demand for health services was created when the state of Washington instituted a policy which required all state employees to pay a \$5 copayment on all physician visits. Cherkin, et. al., (1989), analyzing data from GHC (a Washington State HMO), estimate that the institution of the \$5 copayment decreased ambulatory visits by persons taking cardiovascular medications by almost 20%.⁹ The authors also estimate that introduction of the copayment decreased physical examinations by 14% and decreased all primary care visits by 11%, but the copayment did not cause a significant decrease in the number of

⁸Valdez, et. al., also found that children in a capitated plan had more office visits to a physician per year than children in a fee-for-service plan (3.91 vs. 3.24). The authors conclude that copayment share, rather than type of setting (HMO vs. fee-for-service) is the major factor deterring use of preventive services.

⁹However, this decrease in visits did not cause a significant decrease in the number of prescriptions being filled.

immunizations for young children and cancer screening of middle-aged women.¹⁰ Greenwood and Stewart (1993) analyzed data from HMOs with high and low copayment plan options. They concluded that copayments of up to \$20 per visit will decrease ambulatory visits to all physicians by as much as 25%.

Empirical evidence that cost-sharing policies affect demand for primary care services is important to our model for two reasons. First, since different insurance settings use different pricing schemes, utilization of health services will differ by type of setting. Second, the trend towards increased cost sharing will most likely result in falling utilization rates. The findings by Newhouse, et. al., (1982) lead Weiner to predict that a decrease in first-dollar coverage for surgical/hospital services to 35% of all insured individuals (down from its current level of 60%) would decrease visits to general and family practitioners and internists by 2%. He predicts the decrease in visits to OB/GYNs would be approximately 7%. Similar increases/decreases in the demand of nonphysician primary care providers could be expected with lower/higher cost-sharing requirements.

As employers and insurance plans continue searching for ways to contain health care costs, cost-sharing arrangements will continue to proliferate. Both Short (1989) and Gabel, et. al., (1989) found that during the latter part of the 1980s, employers put more of the health expense burden on their employees. Gabel, et. al., concluded that a large percent of this increase in cost sharing took the form of higher deductibles, while Short's analysis attributes the increased financial burden to a combination of higher employee-paid insurance premiums, higher deductibles, and higher copayment and coinsurance requirements.

6.2.1.3 Provider-induced Demand

In addition to pricing schemes which make insured individuals more responsive to the cost of services, insurers have developed new health care management systems which place a greater burden of the utilization risk on healthcare providers and/or allow payers to have their interests reflected in the utilization decisions. The method by which insurance plans

¹⁰GHC opposed the idea of copayments on preventive care services, but initially charged the copayment because it was not logistically possible to distinguish preventive care visits from nonpreventive care visits.

reimburse providers for their services can create incentives for the provider to alter the manner in which he/she provides care to the patient. Under an FFS plan, the provider's income is positively related to the number of tests and procedures performed (and the number of return visits generated). Financial incentives may induce the provider to increase the number of tests performed, increase the propensity to have patients return for a follow-up visit, or increase the number of referrals. Under a prepaid plan, providers are paid a set amount per person under their care, regardless of the number of visits made by each individual during the specified period of time.¹¹ If health care utilization is higher than expected, the provider may not recover all the costs of resources used. If health care utilization is lower than expected, the provider makes a higher than expected profit. By placing the resource utilization risk on the provider, the physician has an incentive to use less resources than he/she would under an FFS plan.

Hypothetical and empirical analyses to test for provider-induced demand have had mixed results. Hemenway and Fallon (1985) and Lawler, et. al., (1988) presented physicians with hypothetical cases and tried to determine if these physicians "induced" demand. Hemenway and Fallon found evidence of induced demand, in that physician density rates (physician/population ratios) were positively correlated with the aggressiveness of proposed treatment.¹² A natural experiment which lends support to the induced demand hypothesis happened when Medicare Part B payments to physicians were frozen from 1984-1986. During this period, Medicare payments to physicians increased by nearly 30% due to increased volume of services. On a national scale, Weiner estimates that if Medicare RBRVS is fully enacted, the national number of visits to general and family

¹¹Physicians in staff/group HMOs are not usually paid a fixed monthly amount for each patient under their care, but are salaried employees of the HMO. However, salaried physicians — like independent physicians in a prepaid setting — have the incentive not to induce demand.

¹²Hemenway and Fallon argue that for a set level of demand in a given area, greater physician density leads to lower work loads per physician. Thus, physicians in areas with a high physician-to-population ratio will tend to be more aggressive in treating patients (i.e., ordering more tests, procedures, and return visits) to increase their incomes.

practitioners and internists would increase by 2%; he estimates the national increase in visits to OB/GYNs at 4%.

Other studies have reached the opposite conclusion. Lawler, et. al., state they found no evidence to support the hypothesis that physician income, desire for income, or pace of practice had any effect on the amount of services physicians used in the "care" of patients in hypothetical cases. They concluded that in primary care, physician-induced demand (if it exists) has a very small effect on resource utilization. An empirical study by Greenfield, et. al., (1992) found that after controlling for patient and physician characteristics, office visits-per-patient per year are lower in a fee-for-service setting than in a prepaid (capitated) setting. However, hospitalization rates are higher in the fee-for-service setting. A comprehensive review of articles published between 1960 and 1992 by Lewin-VHI (1992) found that, on average, individuals in group HMOs had approximately 7% more outpatient visits than individuals in an FFS setting, after controlling for other factors which affect utilization. The Lewin-VHI study also found that individuals in an IPA HMO had approximately 22% more visits than comparable individuals in an FFS plan. Likewise, Miller and Luft (1994) found that HMO enrollees had about 9% more physician visits, on average, than enrollees in FFS plans, and Witsberger (1993) found that adult ambulatory visits are about 10% higher in an HMO setting than in an FFS setting.

Although there is no direct empirical evidence of induced primary care demand in an FFS setting, it is very likely that induced demand exists. However, it appears that policies which promote the use of primary care services in a capitated setting (e.g., the use of "gatekeepers" and emphasis on preventive care) have a larger effect on health services utilization than does induced demand, so the net effect is higher demand for primary care in a capitated setting.

Currently, prepaid services are the most common form of provider reimbursement in a staff-HMO setting, while FFS arrangements are the major form of provider reimbursement in Medicare, Medicaid, and traditional insurance plans. Approximately half of all IPAs reimburse their network of physicians by fee-for-service, while the other half make prepayments (GAO, 1993). The trend, though, is towards capitation. In an effort to control costs, the federal government and various state governments are experimenting with placing Medicare and Medicaid enrollees into managed care systems.

6.2.1.4 Gatekeepers

Many HMOs do not allow members to see a specialist or go to a hospital for a non-emergency situation without a referral from a primary care physician. Under this cost-controlling practice, primary care physicians act as “gatekeepers” for specialist and hospital services. This gatekeeper policy is most common in staff and group model HMOs (the more restrictive types of HMOs); however, many IPAs have primary care physicians that act as gatekeepers (see GAO, 1993).

The purpose of restricting non-emergency first-contacts to a primary care physician is that visits to specialists tend to be more expensive. Although researchers have found mixed results as to the cost effectiveness of gatekeeper programs, these programs do redirect the use of resources toward primary care physicians. For example, Martin, et. al., (1989) found that after controlling for differences in enrollment composition, people in a gatekeeper plan had 6% more visits to primary care physicians and 9% less visits to a specialist than people not in a gatekeeper program.¹³ These authors estimate the average per capita number of ambulatory visits per year in the gatekeeper setting to be 4.0 visits, while in a non-gatekeeper setting the average number of visits is 4.3. They estimate the number of visits to primary care physicians (3.1, or 78%) and specialists (0.9, or 22%) in the gatekeeper program to be significantly different than primary care visits (2.9, or 67%) and specialist visits (1.3, or 30%) in the non-gatekeeper setting.¹⁴

Weiner estimates that if the number of insured persons covered by gatekeeper programs rises to 50% (up from the current level of 20%), the national number of visits to general and family practitioners, internists, and pediatricians will rise by 2%. However, Weiner estimates that under this assumption, visits to OB/GYNs will decline by 5%.

Independent primary care physicians (who are not in a managed care organization) are an important source of referrals to hospitals and specialist clinics (see Zismer and Fansler, 1992). This economic fact has helped lead to the growth of vertically integrated health care

¹³The authors defined primary care physicians as all general or family practitioners, osteopaths, pediatricians, general internists, and OB/GYNs.

¹⁴Percentages do not add to 100% due to rounding errors.

systems in which hospitals and physicians join forces to meet health care demands. Zismer and Fansler expect this trend to continue.

6.2.1.5 Utilization Review

Utilization review (UR) is another program instituted by insurers to allow themselves to have their interests reflected in utilization decisions. Most UR studies have focused on analyzing the factors which affect a physician's propensity to utilize expensive tests, perform expensive procedures, prescribe expensive drugs, and admit patients to hospitals. Consequently, most of the research on utilization review focuses on factors which affect demand for hospitals and specialist services, rather than on factors which affect primary care services.

Some UR programs do provide cost/utilization feedback to primary care physicians. For example, Community Mutual Insurance Company (CMI) recently instituted a program which rewards primary care physicians based on their performance. Physicians' performance ratings are based on their efficient use of resources, the quality of their service, and their accessibility.¹⁵

Weiner estimates that 55% of all insured persons are currently in plans which conduct utilization review of primary care physicians. He predicts that if utilization review programs increase to the point that all insured persons are part of a comprehensive UR program, the national number of visits to physicians will decline by 2% to 10%. He further predicts that the national number of visits to general and family practitioners and internists will fall by 3%, visits to pediatricians will fall by 2%, and visits to OB/GYNs will fall by 7%.

6.2.1.6 Emphasis on Preventive Care

HIAA (1993) estimates that one-fourth of health care expenditures are a result of "unhealthy" lifestyles (e.g., drug and alcohol abuse, smoking, failure to use seatbelts,

¹⁵Cost efficiency is based on financial measurements (total cost of care per member per year), on adherence to CMI's drug formulary, and on the number of electronic claims submitted. Quality or performance and accessibility are often determined by customer satisfaction surveys.

unsafe sex, and sharing contaminated needles). In an effort to hold down health care expenses, managed care organizations have placed more emphasis on preventive care than one traditionally sees in the private healthcare setting. As mentioned previously, Manning, et. al., (1984) found that in a controlled trial with comparable patients (receiving comparable benefits), HMO enrollees had about 30% more preventive care visits than persons with free care in a fee-for-service sector. This finding is consistent with Miller and Luft's (1994) literature analysis which found that HMO plan enrollees consistently received more preventive care tests, procedures, and examinations than enrollees in FFS plans. This emphasis on preventive care in HMOs increases demand for primary care providers in two ways. First, primary care providers are usually the most qualified individuals to serve in an educating/training capacity. Second, there is an increased demand for checkups, screening tests, and other primary care services.

A literature review by Sofaer and Kenney (1989) finds that health promotion and disease prevention (HP/DP) is more than a short-term fad. Many health care organizations are seriously considering instituting new HP/DP programs or expanding existing programs. For example, Logsdon, et. al., (1987) note that coverage of preventive services is becoming increasingly common in PPOs.¹⁶ The following table shows how emphasis on certain preventive care services varies by type of provider.

**Percentage of Enrollees with Coverage for Preventive Care Services,
by Type of Plan**

Benefits	HMO				
	Conventional	PPO	IPA	Staff/Group	Hybrid
Adult physical exams	34	42	95	99	85
Well-baby care	50	62	98	99	95
Preventive diagnostic procedures	67	71	94	100	98

Source: HIAA Employer Survey, 1989

¹⁶Interestingly, Gabel, et. al., (1989) found that small employers were more likely than larger ones to provide preventive benefits to their employees enrolled in PPO plans. In traditional HMOs, preventive benefits were provided to employees of large and small firms in equal quantities. Their findings were obtained from a survey of 2,621 employers.

Weiner (1993) and Weiner and Frank (1987) estimate that if 75% of the insured population received at least some coverage for preventive care services (up from the current level of 35%), the national number of visits to general and family practitioners, internists, pediatricians, and OB/GYNs would rise by 5%.

Eaton (1993) conducted a study which examined the associations between lack of health insurance coverage and physician utilization using the 1989 National Health Interview Survey (NHIS). She found that Americans without health insurance are less likely to seek early prenatal care, have their children immunized early, obtain annual blood pressure checks, or see a physician. However, her analysis could not determine if these utilization disparities result from lower access to health care or from individual choice.

6.2.1.7 Summary

Our review of the literature on healthcare delivery systems and insurance status has focused on: 1) identifying management and delivery systems that affect demand for health care services; 2) summarizing empirical findings which can be incorporated into our primary care demand model; and 3) identifying trends in management and delivery systems with the intent to predict how evolution in healthcare delivery will affect future primary care demand.

From this literature review we have identified six insurance settings which are dissimilar enough in practice methods and pricing schemes to warrant separate attention in our model. The populations defined by these settings are:

- individuals in fee-for-service insurance plans;
- individuals in staff managed care organizations;
- individuals in IPAs, PPOs, and Point-of-Service managed care organizations;
- Medicare recipients;¹⁷
- Medicaid recipients;¹⁸ and
- the uninsured.

¹⁷Medicare and Medicaid recipients in a fee-for-service setting are analyzed separately from recipients in a managed care setting.

¹⁸Weiner (1993) notes that utilization rates by medicaid recipients are higher than utilization rates of persons privately insured.

Our review of the literature has also identified distinctive characteristics of each type of insurance setting, the effect of these characteristics on health services demand, and how these characteristics are likely to evolve over time.

Differences in practice methods which affect average per capita provider visits include restrictions on what type of provider the patient can see ("gatekeeper" programs), methods of provider reimbursement (fee-for-service vs. capitation), utilization review, and the degree of emphasis on preventive care. Differences in pricing schemes which affect enrollee and patient utilization behavior include the degree of cost sharing (e.g., coinsurance, copayments, deductibles) and the size of premiums. Also, whether or not an individual has insurance is an important factor in utilization behavior because uninsured persons face higher out-of-pocket costs per visit than persons with insurance.

The findings presented in this section suggest that enrollees in HMOs will use more primary care services than comparable enrollees in traditional FFS plans, and that both populations will use more primary care services than comparable uninsured individuals. These differences will most likely increase under the status quo, since more and more HMOs are enacting "gatekeeper" policies, increasing the use of utilization review, and placing more emphasis on preventive care. Also, in the fee-for-service setting, the trend toward higher coinsurance rates and higher deductibles is likely to result in a decrease in average visits per capita, especially for preventive care services.

The following table summarizes the main findings from the literature concerning trends in the health care delivery system and the expected effect of these trends on demand for primary care. These studies addressed the demand for physicians only; they did not address demand for primary care health providers overall, and non-physician providers specifically. A large portion of this information was taken from Weiner (1993, table 11).

**The Effects of Health Care System Changes and Trends on Demand for
Health Care Services: Approximate Increase (+) or Decrease (-) in US
Physician Contacts Relative to Present Situation**

Factor	Assumptions	All MDs ¹	All PCPs	G P/FP	IM	PED	O B/GYN	SOURCE
Cost Containment								
Gatekeeper	50 percent of insured persons covered by gatekeeper program, up from 20 percent	-5 to +2		+2	+2	+2	-5	Weiner (1993)
Gatekeeper	50 percent of insured persons covered by gatekeeper program, up from 20 percent		+2					Martin, et. al., (1989)
Utilization Review	Comprehensive UR programs increase from 55 to 100 percent of insured	-2 to -10		-3	-3	-2	-7	Weiner (1993)
Private Insurance								
Preventive Coverage	75 percent of insured have at least some coverage, up from 35 percent	0 to +5		+5	+5	+5	+5	Weiner (1993); Weiner & Frank (1987)
Increased cost sharing	First-dollar coverage for surgical/hospital services decreases to 35 percent from 60 percent	-2 to -10		-2	-2	-2	-7	Weiner (1993); Newhouse, et. al., (1982)
Increased cost sharing								Manning, et. al., (1984). Lohr, et. al., (1986)
Increased cost sharing								Valdez, et. al., (1989)
National Health Care Reform								
Covering the uninsured	All uninsured covered; patterns of use similar to Medicaid population.	+13		+15	+15	+15	+15	Weiner (1993)
Covering the uninsured	All uninsured covered; 50 percent use services as does Medicaid population, 50 percent use like privately insured	+10		+13	+13	+13	+13	Weiner (1993)

Physician Reimbursement								
RVS-fee schedule	Medicare RBRVS fully enacted	0 to +5		+2	+2	0	+4	Weiner (1993)
RVS-fee schedule	Medicare RBRVS fully enacted		0					Lawler, et. al., (1988)
RVS-fee schedule	Medicare RBRVS fully enacted		+					Hemmenway & Fallon (1985)
Bundling of services	Medicare adopts APGs & MD-DRGs	- to +		-	-	0	-	Weiner (1993)
Guidelines and Quality								
New policies	Practice guidelines and QA programs spread	+	+	+	+	+	+	Weiner (1993)
New Medical Technology								
New technology	General impact of new technologies (medicines, techniques, equip)	+	+	+	+	+	+	Weiner (1993)

¹MDS=Medical Doctors, PCPs=Primary Care Physicians, GP/FP=General and Family Practitioners, IM=Internists, PED=Pediatricians, OB/GYN=Obstetricians and Gynecologists.

6.2.2 Socioeconomic and Demographic Characteristics

The socioeconomic and demographic characteristics of an individual are important factors influencing demand for primary care services. Some of these factors (age and gender) have a strong impact on healthcare needs and health status, while other factors (income and geographic location) might affect an individual's accessibility to, and the affordability of, care. Finally, these factors (and race/ethnicity) affect a person's lifestyle, which can affect both the need for healthcare services and the decision to obtain services.

6.2.2.1 Age

All the major empirical studies on demand for health services have included some type of age-related variable when age data is available for their analyses. Their major findings are that an individual's need for health care services declines from birth to middle-age, and then begins to rise (see for example, Witsberger, 1993; and Leibowitz, et. al., 1992). The

exception to this is that demand for health services by women (mainly for obstetrical and gynecological services) rises during their child-bearing years.

The major impact of age on demand for primary care services will result from the aging of the general population. However, several trends which affect the accessibility to primary care providers by persons of different ages may cause changes in the current utilization rates associated with each age category. For example, Crowley (1990), analyzing a survey of daycare centers, found that 96% of daycare centers reported they had a health consultant. She found that fewer than 50% of the centers surveyed offered more than three primary care health services for children, but that center directors were very interested in offering more comprehensive primary care services. The biggest impact on health care providers of offering more primary care services to daycare centers would be for nurses (for training, treating infectious diseases, teaching proper hygiene, and screening). Seventy-seven percent of the centers stated they received nursing consultations either on-site or by phone. The average center utilized about four hours of nursing services per month and a smaller amount of physician services. Therefore, we conclude that any increase in primary care services provided at daycare centers would translate into a small increase in the demand for nursing services and an even smaller increase for primary care physicians. Ninety four percent of the centers indicated they had a physician consultant, but most consultations were by phone and the average physician utilization was less than one hour per month. These primary care services were sometimes provided on a fee-for-service basis, and sometimes were provided free of charge.

Demand for primary care services by children and teenagers could change if schools decide to increase/decrease the use of school-based clinics or healthcare providers. Likewise, changes in the Medicare program could have a big effect on demand for primary care services by the elderly. For example, as more elderly enroll in Medicare HMOs or the Medicare Select (a PPO-version of Medicare) program, their use of primary/preventive care may increase.

6.2.2.2 Gender

Empirical studies which have gender as an explanatory variable in their health services utilization model find no significant differences in health use by sex of child, but do find

that sex differentials in use emerge during adolescence (see Leibowitz, et. al., 1992; and Witsberger, 1993). This sex differential increases when women reach their child-bearing years, because visits per capita for women are increasing (mainly for obstetrical/ gynecological reasons) while utilization rates for men are decreasing. This differential levels out after about age 55.

6.2.2.3 Income

The economic resources of an individual or family are important factors in determining demand for health services for several reasons. First, health care is a normal good — people at higher levels of income will demand (and be able to afford) more services. This economic phenomena works at both the micro (individual) level, and at the aggregate (national) level. Witsberger found that the number of visits per child per year increases with family income, and Manning, et. al., (1987) found that the likelihood of using any medical services is positively correlated with income. Furthermore, Manning, et. al., found that the effect of copayments and deductibles on health services utilization differs greatly by income group. Since a given copayment or deductible comprises a larger percentage of total income for a poorer family, it has a larger deterrent effect for individuals with lower incomes.

Second, economic resources play a big factor in who purchases private insurance or receives public-funded insurance. Finally, an individual's economic resources affect demand for health services indirectly in a number of other ways. Economic resources play an important role in an individual's lifestyle, and lack of economic resources can affect a person's mobility (access to care). For example, Leibowitz, et. al., (1992) found that larger families with Medicaid use fewer medical services per person, even when care is free, than smaller families with Medicaid. Most likely, this reflects the increasing cost and difficulty in making a doctor visit accompanied by more children.

6.2.3.4 Geographic Location

Demand for health care services varies across geographic locations for a number of reasons. While much of the geographic variation in health services utilization can be explained by differences in socioeconomic and demographic differences (observed

population characteristics), there remain significant differences in utilization that are generally attributed to differences in unmeasured/unobserved characteristics. In our primary care demand model we have divided geographic locations into rural and urban categories for two reasons. First, this categorization is consistent with the literature and in data sources. Second, sufficient differences in demand for health care services exist across geographic location (even after adjusting for differences in the makeup of the populations) to discourage pooling these populations.

Christianson and Moscovice (1993), Ermann (1990), Cordes (1989) and others note that compared to the urban population, people in rural areas, on average, are poorer, have lower educational levels, are more likely to live in substandard housing, and comprise a disproportionate share of the elderly.¹⁹ In addition, they are more likely to be involuntarily unemployed or self-employed (leading to lower rates of insurance coverage), less likely to be an ethnic minority, less likely to be in a one-parent household, and have further to travel to receive health care.²⁰

Rural populations are more likely to be “supply constrained” in receiving health care services because rural communities have a difficult time attracting and retaining physicians (see Christianson and Moscovice, 1993, and Ermann, 1990). Although physician/population ratios are significantly lower in rural areas — Christianson and Moscovice estimate the ratio in the rural setting to be half that in the urban setting — Jensen and Hietbrink (1987) find that rural physicians appear to offer more services, on average,

¹⁹Although education level is not one of the explanatory variables in our primary care model, education level is highly correlated with the other variables in our model (especially income).

²⁰Rowland and Lyons (1989) find that those rural residents who are insured generally have less comprehensive coverage than urban residents. This might be a result of supply factors (lower availability of more comprehensive policies) or demand factors (less white-collar and high-paying jobs are available in rural areas, and people in rural areas are more likely to be self-employed than people in urban areas). The authors also find that only 25% of the rural poor receive Medicaid benefits, compared to 43% of the urban poor. This difference in Medicaid enrollment may be a result of lower levels of eligibility awareness on the part of the rural poor, differences in attitude toward government programs, transportation difficulties for the rural poor, or lack of government infrastructure in rural areas.

than their urban counterparts. Jensen and Hietbrink also find that rural physicians are more likely to limit referrals, but they could not tell if this lower propensity to refer patients to specialists was an attempt to maintain their patient load, or due to lack of specialists within reasonable traveling distances.

Christianson and Moscovice predict that under health care reform a large percentage of rural providers will be organized into networks to contract with health plans or with health insurance purchasing cooperatives (HIPCs). They hypothesize that health care reform and HMO penetration may increase the professional support and income that physicians receive, which may help to attract new primary care physicians to rural areas and help retain existing rural providers.

6.2.2.5 Race/Ethnicity

After controlling for socioeconomic differences between Blacks and Whites, empirical studies find that white individuals are more likely to visit a physician during a given time period than are black individuals. Witsberger's (1993) analysis of data from the 1989 NHIS found that black children have fewer physician visits per year than white children, even after controlling for family income. However, she did not control for where the children lived, and studies have shown that people living in inner cities might have greater difficulty in visiting a physician because physician/population ratios tend to be lower in inner cities than in the suburbs.

Lifestyles may differ greatly across different ethnic and racial groups, and this could affect demand for primary care services. For example, Anderson, et. al., (1987) found significant differences between Blacks and Whites in the usage of tobacco and alcohol, and in their propensity to exercise. Also, the authors found significant differences between the two groups in incidence of high blood pressure, births with low birthweights, and sexually transmitted diseases.

No major studies have been conducted which analyze utilization rates for non-black Hispanics separately from other minority groups, however, we will investigate the potential use of identifying this population separately in our model. The Hispanic population is one of the fastest growing populations in the US, so any differences in utilization behavior between Hispanics and non-Hispanics should be taken into consideration.

6.3 INCORPORATING ELEMENTS OF THE NEED FOR PRIMARY CARE

For purposes of this discussion, we have distinguished the demand for primary care from the need for primary care, where demand includes factors that could restrict the use of (e.g., limited accessibility due to inadequate supply or high cost-sharing), or encourage unnecessary use of (e.g., induced demand in fee-for-service arrangements) primary care and need conforms to an epidemiological standard for care required. Possible sources of data on the need for primary care include: 1) the use of enrollees in health insurance plans that offer generous coverage for primary and preventive care services; and 2) standards or guidelines for preventive care.

Our general approach to incorporating elements of need into the model will be to identify population subgroups whose demand is clearly suppressed (due to lack of insurance, for example), and develop scenarios in which their utilization of services is brought in line with less disadvantaged groups. For example, we expect one of our scenarios to involve universal health insurance. We also will explore the capability to run scenarios that eliminate systematic discrepancies in utilization rates across ethnic groups that appear to reflect unmet needs.

Given the current structure of the health care system in the United States, there is very little opportunity to observe true need for primary care. Even experimental situations that offer care free, such as the RAND Health Insurance Experiments of the 1970s, cannot remove all the biases caused by lack of information and other such factors that influence individuals who may “need” care to not demand it (see Manning, 1984).

Therefore, in our literature review we have focused on clinical guidelines and other standards for use of preventive services as a measure of the need for primary care. These guidelines, in combination with general primary care that presents with a common acute illness or chronic illnesses, offer a closer measure of need than the service use observed under our current health care system.

“Healthy People 2000: National Health Promotion and Disease Prevention” outlines the Department of Health and Human Services’ (DHHS) goals for the nation, one of which is achievement of access to preventive services for all Americans (see NCHS, 1992). Examples of the use of preventive services that DHHS has established goals for include:

- Counseling by providers — 75% of clinicians providing counseling and screening for alcohol and drug abuse and mental health.
- Cancer screening — 60% of women age 50 and over reporting having had a mammogram or breast exam in the last one to two years, 40%-50% of persons over age 50 screened for colon/rectal cancer, 85% of women age 18 and over reporting a pap smear in the last three years.
- Prenatal and infant care — 90% of live births with prenatal care in the first trimester; 90%-95% of newborns receiving screening and treatment; 90% of babies receiving primary care.
- Immunizations — 90% basic immunization series among children; 80% pneumonia and influenza immunization among high risk populations and 60% among others.
- Clinical preventive services — at least 50% of persons receiving, as a minimum within the appropriate level, all of the screening and immunization services and at least one of the counseling services appropriate for their age and gender as recommended by the US Preventive Services Task Force (see discussion below).

These goals could be translated into implied use rates for these services, which could serve as measures of need.

A report by the US Preventive Services Task Force provides another source of need-based use of preventive health care services (see US Preventive services Task Force, 1989). The Task Force assessed the effectiveness of 169 preventive interventions and developed a schedule of recommended screening, counseling, and immunizations at different ages. The Task Force cautions that the list is not exhaustive and for some age groups is not definitive regarding the timing of visits, but the general outline provides a possible basis for estimating need for preventive services.

7.0 POTENTIAL HEALTH CARE REFORM SCENARIOS

To ensure the relevance and usefulness of the personnel requirements for primary care providers estimated by the integrated requirements model, the health care reform scenarios considered should represent the spectrum of potential scenarios, from current market trends to varying degrees of government intervention in the health care market and various combinations in between, including alternative scenarios for market evolution. The health care reform scenarios should also permit the specification of alternative staffing models as a potential scenario to determine the range of requirements for the different primary care providers under alternative methods for delivering care.

Although the final report will present three scenarios as required in the contract, we believe that an important feature of the model will be its ability to generate numerous scenarios through the combination of various parameters. This will enhance the model's usefulness by permitting the ability to examine a wide range of potential scenarios in response to the changing health care market and political environment.¹ In this literature review, we do not specify the three scenarios for the final report, but instead provide information to assist the decision-making process toward the three scenarios and the necessary model parameters that need to be considered for development.

We believe that any potential "health care reform" scenarios will likely be combinations of the following:

- **Market Trends** — Market trends in the health care system, including increased managed care and corresponding changes in the delivery system, increases in the number of uninsured, and higher cost-sharing for "traditional" plans continue, and greater use of practice guidelines, have an effect on primary care requirements.
- **Government Intervention** — Either federal or state intervention in the health care system would likely have an effect on primary care requirements. The intervention could include any one or a combination of the following: constraints on expenditures; increased affordability of insurance; universal coverage; insurance market reform; and/or delivery system changes.

¹This will also complicate specification of values for parameters under alternative scenarios due to the potential interactive effects of different provisions, many of which have not been experienced in the US health care system.

- Alternative Staffing Models — Alternative staffing models that use different combinations of primary care providers to serve a fixed population (primarily from group/staff model HMOs) can be used as standards for broader segments of the population to estimate a range of potential requirements for different types of providers.

Furthermore, each of the potential scenarios need to reflect the implications of specific assumptions regarding:

- Demand for Primary Care — Each scenario needs to include assumptions regarding the effect on the amount of primary care services sought either through increased numbers of persons seeking primary care or an increase in the average number of primary care services for persons who receive primary care. As discussed in chapter 6.0, major factors affecting demand include: epidemiology, the total population and its characteristics, and insurance coverage/prices faced.
- Staffing Configurations and Productivity of Providers of Primary Care — Each scenario needs to include assumptions regarding the effect on the configuration of the health care system and how plans are staffed to meet the demand for primary care. Both staffing and productivity are affected by the incentives created by the reimbursement system and regulation of the market. Under a capitated system, the incentives would likely tend to move care to the lowest cost provider and to minimize the number of visits. Under an unmanaged fee-for-service system, there is little incentive to move care to lower priced providers and the number of visits recommended by providers could be biased upward (“provider-induced demand”) to maximize their income potential.

The remainder of this chapter is organized around the three basic elements that will be blended to define specific scenarios: market trends, government interventions, and alternate staffing models.

7.1 MARKET TREND FEATURES

We have identified four market trends that influence the demand for primary care or the productivity/staffing to provide primary care services. These trends are:

- increased managed care penetration;
- increasing cost-sharing requirements;
- greater use of guidelines and outcome measures; and
- declining insurance coverage.

Increasing health care costs appear to be the driving force behind the market trends identified above. Since 1980, per capita national health expenditures have increased 9.1% annually and are projected to continue to increase faster than inflation. National health expenditures as a percentage of Gross Domestic Product (GDP) have increased from 9.2% in 1980 to 14.3% in 1993 and are projected to approximately double the 1980 level by the year 2000 (CBO, Oct. 1993).² In an effort to contain health care costs, employers and insurers have turned to managed care, higher cost-sharing requirements and the greater use of guidelines and outcome measures as tools to reduce the rate of health spending. It is hypothesized that higher health care costs are a contributing factor to the declining health insurance coverage due to the unaffordability of premiums. Higher premiums induce some employers and individuals to drop coverage. The next four subsections discuss these issues in more detail.

7.1.1 Increased Managed Care³

While there is no single formally accepted definition of managed care, a working definition might best be stated as:

Managed care entails interventions to control the price, volume, delivery site, and intensity of health services provided, the goal of which is to provide cost-effective care and the coordination of health care management for the covered population.

Managed care may address cost by:

- seeking to have care delivered in the most appropriate, least costly or least intensive settings (e.g., substituting outpatient care or home-based care for inpatient services);

²We note that for the fiscal year 1996 budget cycle, CBO is currently revising its health expenditure projections. These projections are likely to be lower than those cited here. Recent evidence regarding the level of health expenditures suggests that increases may have been lower than expected.

³The material in this section borrows heavily from a Lewin-VHI report for the American Hospital Association entitled, "Managed Care: Does it Work?", 1993.

- shifting and sharing the risk for the costs of patient care through prospective determinations of payments; and
- obtaining discounted prices from providers in exchange for a guarantee of large patient volume made possible by channeling patients.

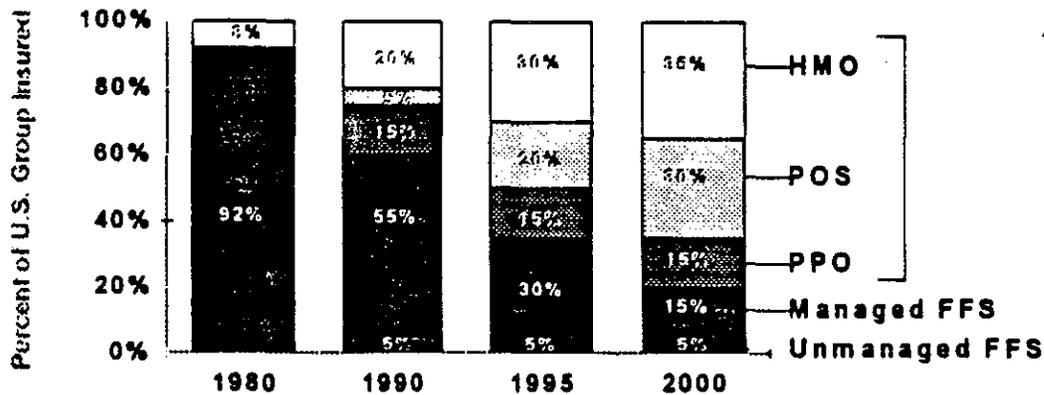
Managed care may target volume or utilization of services by providers and beneficiaries by:

- stressing wellness, prevention, and early medical care, and making these services financially attractive to enrollees through low/no co-payments for these services;
- offering incentives to physicians to limit other providers' utilization;
- reducing the incidence of unnecessary or duplicative services through pre-screening, provider coordination, beneficiary incentives, precertification, and second opinion requirements for extensive procedures;
- employing treatment protocols to assist clinicians in diagnosing and treating patients and to reduce medically inappropriate or unnecessary procedures;
- steering patients to providers who consume fewer resources in achieving given outcomes;
- emphasizing techniques and technologies that require less intensive treatment;
- economic profiling of physician utilization in order to reduce service provision; and
- establishing fixed levels of payment per enrollee, thus linking providers' economic interests with reduced utilization.

Over the past decade, managed care has moved from having approximately 8% of the insured lives in the group/employer health insurance market covered by HMOs to the dominant form of health care delivery today with 95% of this market under some form of care management (although only 30% of the market is on the most aggressive forms of managed care).⁴ The exhibit on the following page demonstrates the growth in managed care within the group/employer market.

⁴Lewin-VHI estimates based on historical data from the Group Health Association of America (GHAA) and the Health Insurance Association of America (HIAA).

Network-Based Forms of Managed Care Will Dominate By 2000 Group/Employer Market



Source: GHAA, HIAA, Lewin-VHI

Note: The definitions of each form of coverage are discussed in Section 6.2.1 Factors Related to the Health Care Delivery System.

In addition, the government health insurance programs, Medicare and Medicaid, have had increasing levels of managed care. In January 1994, Medicare had 1.8 million enrollees in capitated systems (TEFRA risk contracts) and an additional 0.2 million in managed health delivery systems (TEFRA cost contracts), for a total of 5.6% of beneficiaries in managed care (Committee on Ways and Means, 1994). As of June 30, 1994, approximately 24% of Medicaid recipients are enrolled in managed care plans, 59% of which are in fully capitated plans (HCFA, 1994). Medicaid managed care enrollment in capitated plans has more than tripled in the past three years.

While the impact of managed care appears to be increasing in nearly all market areas of the country, the managed care industry is particularly influential in urban areas. According to the Group Health Association of America's 1992 and 1993 Directory of HMOs, approximately 88% of all HMO enrollees resided in one of the nation's 54 largest metropolitan areas (MSAs), although the proportion of the US population residing in these areas is 56%. The table on the following page shows the national percentage of the population enrolled in HMOs, commonly referred to as the "HMO penetration rate".

HMO Penetration as of 31 December 1993
(numbers in thousands)

Area	HMO Enrollment	Total Population	Percent in HMOs
Top 54 MSAs	34,043	142,369	23.9%
All other U.S. areas	4,573	110,020	4.2%
Total U.S.	38,616	252,390	15.3%

Source: Statistics calculated from GHAA National Directory of HMOs, 1992 and 1993 editions.

Managed care has meant increases in horizontal and vertical integration among providers. Horizontal integration is the coalescing of like-provider entities. Examples of horizontal integration include:

- merging of solo practices to form single-specialty practices;
- merging of two or more group practices;
- greater use of non-physician providers;
- merging of single hospitals to create hospital systems; and
- formation of physician organizations (POs) or independent practice associations (IPAs).

Increases in the percentage of physicians practicing in groups and larger average physician group sizes provide evidence of providers integrating horizontally. In 1965, only 10% of physicians were in groups and in 1992 one-third of physicians were practicing in groups. The average size of a physician group in 1992 was 11.5, up from 6.3 in 1969 (AMA, 1993).

Vertical integration merges different types of provider groups, joining various levels of care. Examples of vertical integration include:

- hospital-physician collaboration, e.g., physician-hospital organizations (PHO);
- joint ventures between physicians and other health professionals, e.g., physical therapists; and
- hospital linkages with home health care agencies, nursing homes, etc.

Networks which include both the provider and payors have the greatest incentives to find the most efficient and effective providers while also encouraging healthy behavior and preventive measures.

While the impact of the managed care industry in any given area will be influenced by a multitude of local and national phenomenon, the following predictions can be made fairly safely.

- Managed care programs will continue to accumulate market share in nearly all urban market areas; however, many rural areas will continue to experience little managed care activity. The minimal managed care activity in rural areas can be attributed to the economics of managed care markets. A minimum population density appears to be necessary to support this type of health care delivery system on a competitive basis (Kronick, et. al., 1993).
- The population will not only shift toward managed care in general, but within the managed care industry, enrollment will continue to gravitate toward more restrictive models (i.e., HMOs) where the cost containment potential is perceived to be the greatest.
- The above trends will persist regardless of the outcome or implementation of health care reform. However, federal, state, and local reform efforts could affect the speed of the growth of managed care programs and their effectiveness.⁵
- States will continue to develop and expand initiatives to transition their Medicaid populations into managed care programs.
- Medicare, with only six percent of its population enrolled in HMOs, will be the predominate “hold-out” in the managed care movement until federal fiscal pressures dictate more assertive steps to restructure Medicare.

7.1.2 Increasing Cost-Sharing

As discussed earlier, cost-sharing requirements affect the amount of care sought by individuals and cost-sharing requirements have increased in recent years. Primary care is considered particularly vulnerable to the suppressive effects on utilization imposed by cost-sharing, because the services are often viewed as optional. As employers and insurers

⁵For example, the enactment of “any willing provider” laws may affect both the growth rate and effectiveness of managed care.

continue to reduce the rate of increase in health expenditures, we expect that cost-sharing requirements will continue to increase.

7.1.3 Increased Use of Guidelines and Outcomes Measures

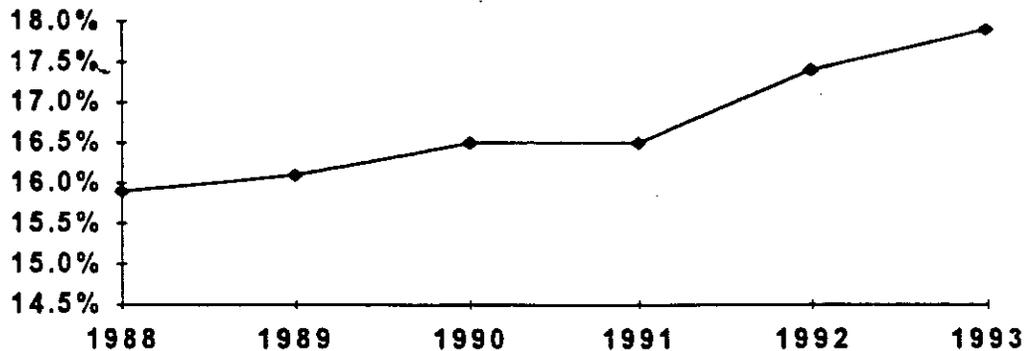
The Agency for Health Care Policy and Research (AHCPR), the Mayo Clinic, and other private organizations are currently developing practice guidelines to assist health care providers in determining the most appropriate course of treatment. These efforts are often being linked with strategies to measure the outcomes of alternative treatment protocols. These measures could result in more appropriate utilization of services, a reduction in unnecessary services (e.g., less defensive medicine), better outcomes, and perhaps lower costs in the long run. Widespread adoption of these initiatives may change the delivery system configuration as demand for some services increase while other decrease.

7.1.4 Declining Insurance Coverage

We noted previously that uninsured individuals use significantly less health care services than those with health insurance coverage. A lack of health insurance also reduces the likelihood an individual has a usual source of care. It is hypothesized that the uninsured are more likely to defer seeking needed health care services, particularly primary/preventive care services. As the graph on the following page shows, over the last several years, the percentage of the non-elderly population without health insurance has been steadily increasing. Absent government intervention to expand health insurance coverage, this trend can be expected to continue.⁶

⁶A significant reduction in the rate of growth in premiums would also begin to reverse this trend.

**Percent of Non-Elderly Population
Without Health Insurance**



Source: Bureau of the Census, March Current Population Survey (CPS).

7.2 Government Intervention Features⁷

We identified five broad government interventions that influence the demand for primary care or the productivity/staffing to provide primary care services. These interventions are:⁸

- universal coverage;
- constraints on expenditures;
- increased affordability of insurance;

⁷Data on the status of state health reform efforts in this section were compiled by Lewin-VHI for the Office of the Assistant Secretary for Planning and Evaluation (ASPE) based on information from the National Governors Association, the Intergovernmental Health Policy Project, and interviews with states.

⁸“Anti-managed care” laws could also be considered a government intervention. However, we chose to consider these under the market scenarios.

- insurance market reform; and
- delivery system/regulatory changes.

As the new 104th Congress begins, we expect that health insurance market reform, changed to Medicare and Medicaid, and medical savings accounts may be pursued, but comprehensive federal health reform does not seem likely. As a result, the focus of potential government efforts has shifted toward the states.

As of the Fall of 1994, 37 states had enacted limited health reforms, where limited was defined as reform measures that focused on targeted populations or discrete aspects of the delivery system (e.g., small group reform). An additional eight states⁹ had enacted comprehensive reforms, where comprehensive was defined as reform measures which affect the general public and are likely to create significant changes in the way care is delivered and financed. Ten of the states with limited reforms currently enacted are currently considering more comprehensive proposals. Below, we discuss each of the broad government interventions identified and the extent to which states have pursued each of the interventions.

7.2.1 Universal Coverage

Universal health insurance coverage was a centerpiece of the Clinton Administration's "Health Security Act". With approximately 40 million persons without health insurance, some states have attempted to expand coverage to their own residents. In 14 states, the legislature has stated a goal of universal health insurance coverage. Among these states, five included some form of mandate, either employer or individual, for coverage to achieve this goal.

7.2.2 Constraints on Expenditures

While some states attempt to constrain Medicaid expenditures by moving this population into managed care, other states have considered more direct and broad-based

⁹The eight states are Florida, Kentucky, Hawaii, Maine, Massachusetts, Minnesota, Oregon, and Washington.

methods of constraining health spending. There is very little agreement on the methodology for achieving constraints in health care expenditures. Basic mechanisms for reducing health care expenditures include: lower payments to providers, higher cost-sharing for consumers, rationing, promotion of wellness and preventive care, tax inducements to reduce expenditures¹⁰, and reductions in unnecessary care and other system excesses. Eight states, faced with a rising proportion of their budgets going to health care, have legislation in place to control physician expenditures. Five of these states have overall expenditures limits or targets for health spending, but none of them have enforcement mechanisms. Five of these states regulate physician fees, usually for Medicaid only.

7.2.3 Increased Affordability of Insurance

In our analysis of state health reform activities, we identified two principle approaches states have used to increase the affordability of health insurance: high risk pools and subsidized health insurance coverage. High risk pools permit individuals who otherwise might not obtain coverage from private insurance companies due to illness to purchase insurance through state sponsored, and in some cases, subsidized, pools. Twenty-five states have established high risk pools. Most of the states in New England and the Mid-Atlantic do not have high risk pools because “traditional” Blue Cross/Blue Shield plans serve as de facto high risk pools through open enrollment and community-rating.

The majority of states (40) offer subsidized health insurance coverage to their low income residents. Included in this estimate are all states that offer Medicaid or subsidized health insurance to groups not categorically eligible for Medicaid. These are individuals with sufficiently low financial resources that would qualify them for Medicaid benefits, but do not fit one of the categorical requirements for Medicaid eligibility (e.g., cash recipients of Aid to Families with Dependent Children (AFDC) or Supplemental Security Income (SSI), and the aged.)

¹⁰For example, various “Medisave” proposals allow individuals to keep dollars allocated for health care coverage if they do not use them.

7.2.4 Insurance Market Reform

Basic insurance market reforms include regulatory actions by states to reduce the premiums and underwriting barriers to obtaining health insurance. These include open enrollment, guaranteed issue, guaranteed renewal, “no cancellation”, portability, or limited pre-existing conditions. The majority of states (43) have basic insurance market reform provisions, but often they apply only to individuals or small group markets. Among these 43 states, 20 have community-rating. Community-rating can take many forms, but the basic principle is to spread the risk of health care costs across a broader group so that those with high-cost illnesses are not singled out for higher premiums. Mandatory participation in community rated risk pools for small groups is one form of this reform. Again, as with the basic insurance market reform, in most states community-rating only applies to individual or small group markets. Finally, six states with community-rating have some form of uniform benefit provisions. Hawaii also has uniform benefits, but no community rating. Uniform benefit provisions have the effect of further guaranteeing that the risk of health care costs are spread more evenly. Uniform benefit provisions limits the ability of an insurance company to tailor benefit packages to attract low costs purchasers and dissuade those with high health care costs.

7.2.5 Delivery System/Regulatory Changes

A final form of government intervention in health care is delivery system and regulatory changes. An example of delivery system changes would be government-sponsored health insurance purchasing cooperative where individuals and businesses can pool their purchasing power. Most of the activity toward this type of delivery system change has occurred among providers and businesses and not through government intervention.

The regulatory changes referenced here are those affecting the delivery system and do not include those discussed previously that affect insurance. Regulation of the delivery system includes government approval of construction and capacity of institutional facilities (hospitals and nursing homes), licensing of facilities and health professionals, and defining the scope of practice for non-physician providers.

7.3 ALTERNATIVE STAFFING MODELS

Another set of scenarios can be built around alternative staffing models that use different combinations of primary care providers to serve a fixed population (primarily from group/staff model HMOs). These staffing ratios could be used as standards for broader segments of the population to estimate a range of potential requirements for different types of providers. For example, using the primary care provider-to-population ratios of a large HMO that emphasizes the use of nonphysician providers would provide an estimate of the requirements more heavily weighted to NPs, CNMs, and PAs. Using an alternative staffing pattern observed for persons in health care markets with very little HMO penetration and minimal use of nonphysician providers would produce an estimate of the requirements for primary care providers more heavily weighted to physicians. Scenarios could be designed around phasing a transition toward favored staffing alternatives.

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Part III:
Implications For The
Modeling Effort

8.0 IMPLICATIONS FOR THE MODELING EFFORT

The results of the literature search, along with input received from the government client and the Joint Working Group, will be incorporated into the personal computer-based integrated requirements estimates model that is currently under development. Some of the more significant implications for the modeling effort that were revealed during the literature search are summarized in this chapter. We begin with a discussion of the model structure and end with the recommendations for the scenario capabilities of the model.

8.1 MODEL STRUCTURE

Based upon the information gathered in the previous seven chapters, we are designing the core of the model to focus directly on the numbers of practitioners required to serve a given population. The first step in estimating practitioner requirements under this approach will be to assign populations to delivery settings (e.g., non-rural Medicare HMO). The next step will be to assign staffing models to each delivery setting, defined in terms of numbers of practitioners required per 100,000 population served. The assignment of populations and staffing models to delivery settings is part of creating a particular scenario. Cost effectiveness will also be addressed by incorporating practitioner salary data into the model. This will allow the user to make cost comparisons across scenarios.

This "capitated" approach differs from our initial design which centered upon the demand for primary care visits and the staffing models for providing them. Advantages and limitations of this new approach, and the role of visits, are described below.

8.1.1 Advantages of a Capitated Modeling Approach

A capitated approach to estimating provider requirements has a number of advantages over a design that focuses on the demand and supply of primary care visits. These include:

- a stronger empirical foundation;
- a clearer and more tractable definition of practitioner requirements;
- easier expansion of the model to include other practitioner types.

Stronger Empirical Foundation

The literature search revealed the difficulties that we would encounter in trying to develop practitioner productivity and competency rates stated in terms of severity-adjusted primary care visits, as would have been required in the initial model design. For example, as discussed in chapter 4.0, the literature refers to three ways productivity rates can be measured: time per visit; number of visits per unit time; and practice productivity. All three of these have their associated shortcomings that are not encountered in the new design, which is more readily supported by the available data.

Our literature search has revealed a number of potential sources of data for constructing staffing-population ratios suitable for use in the newly designed model. Many of these relevant data sources are discussed in section 3.1. An in-depth discussion of how these and other relevant data sources will be utilized will be provided in subsequent project documents.

Clearer and More Tractable Definition of Practitioner Requirements

Under this new design, the integrated requirements estimates for primary care practitioners can be clearly defined as the number of practitioners required in order to attain the staffing ratios that the model user has chosen for each delivery setting. It is not necessary to define precisely what is included in primary care visits or which practitioner is performing which visit. This is a major advantage, given the difficulties inherent in developing a workable definition of primary care visits. These difficulties were discussed in section 6.1, and are due mainly to the fact that current classification schemes are insufficient to capture what might be considered primary care, in part, because there is a lack of consensus on the definition of primary care.

Easier Expansion of the Model to Include Other Practitioners

The new design will provide the government with a model that can be easily expanded to include additional physician practitioner types. Looking ahead, there are important reasons to favor such a design. For example, our literature search has demonstrated that requirements for specialists are increasingly being influenced by the availability and uses of primary care practitioners. A model that recognizes this interrelationship has clear benefits.

Once additional practitioner types are included in a model of this type, the implications of different staffing patterns on the full range of practitioner requirements can be analyzed.

For example, staffing patterns for HMOs that shift care from specialists to primary care physicians can be applied to determine the extent to which requirements for specialists are reduced and requirements for other practitioners are increased when transitioning to this style of health care delivery. This has been called “off-loading”, and occurs when work is transferred to the least costly provider that can competently provide the services necessary. This and other service allocation issues were described in section 3.5.

8.1.2 Limitations of a Capitated Modeling Approach

In addition to significant advantages described above, our “capitated” model design also results in certain limitations. In some instances, the advantages and limitations are one and the same. As discussed in the previous section, a major advantage of this approach is that it avoids having to develop an operational definition of primary care services. Instead, the model focuses directly upon primary care practitioners. The limitation of this approach is that it potentially ignores that component of primary care services that are provided by non-primary care practitioners. On balance, we believe that this limitation is outweighed by the increased tractability of the capitated approach.

The elimination of visits as the unit of supply and demand brings both advantages and limitations. The primary advantage is the avoidance of problems associated with adjusting visit measures to where they can be considered comparable across alternate data sources and provider types. The limitation is that the model avoids making statements about which practitioner is providing what kinds of visits. Again, from a practical viewpoint, the advantages would appear to outweigh the limitations.

8.1.3 The Role Of Visits

Because empirical capitated staffing patterns will not be observed for every circumstance represented in our scenario capabilities, we will look into algorithms for adjusting observed staffing patterns to reflect how they would be likely to change in response to a changed parameter. These algorithms will likely be based upon an analysis of per capita primary care visit rates.

As an illustration, suppose a staffing pattern is observed for a population where coverage for preventive services is very limited. One may wish to define a scenario in which this staffing pattern is employed but where coverage for preventive services is increased. An analysis of how per capita visit rates increase when coverage for preventive

services is increased could form the basis for adjusting the capitated staffing pattern to reflect such coverage.

8.2 SCENARIO CAPABILITIES

While the contract calls for integrated requirements estimates under three scenarios, the model is being designed to permit the user to experiment with a multitude of scenarios. The aim is to permit analysis of the likely impacts on practitioner requirements of a wide array of potential changes in the health care environment and health plan staffing philosophies. These building blocks can then be used to tailor the three specific scenarios required by the contract.

The literature search has confirmed the importance of a number of factors to be considered in scenario construction, including population demographics, various market trends, and potential government interventions. Market trends include expansion in the number of individuals covered under managed care alternatives and trends within these managed care categories. Government interventions include factors such as universal coverage and global budgets. Populations in the model must be defined according to these various demographic and environmental factors in order to permit the desired scenario analyses.

8.2.1 Addressing Aspects of Cost Effectiveness

The literature search has shown that while empirical evidence generally supports the notion that NPs, PAs, and CNMs are cost effective, it is not conclusive because of the complexity of the issues and because much of the data are out of date. There is ample indirect evidence of their cost effectiveness — namely that they are in high demand and their salaries are increasing.

While the scope of work for the contract called for a consideration of the measurement of the relative costs of delivering primary care services by all four practitioner groups, original research to develop these measures was beyond the scope of this project and empirical sources in this area were lacking. However, it was also noted that it needed to be addressed in order for the overall project to have value. Thus, it will be important to incorporate such measures as salary/income and total compensation data into the model to permit cost comparisons across scenarios. Note that we do not generally expect to be able

to compare quality across scenarios. Unless there is obvious evidence to the contrary, we will assume that quality is equivalent across scenarios.

When comparing these costs across scenarios, it will be crucial to recognize that scenarios which minimize the total salary costs are not necessarily the most cost effective overall. One reason is that there are costs in addition to salaries that must be considered, such as laboratory and prescription charges. The net effect cannot be determined until specialists are incorporated into the model.

Finally, note that comparing costs across scenarios under this capitated approach actually addresses productivity issues without having to explicitly measure individual practitioner productivity. Each empirical staffing model represents an observed level of productivity for an overall practice, where productivity is defined in terms of the enrolled population served (as opposed to visits provided) by the practice. If NPs, PAs, and CNMs are indeed cost effective, then observed staffing models that utilize them liberally should prove less costly per 100,000 persons served.

8.2.2 Defining Alternative Scenarios According to Variations in Staffing Mix

The literature search has identified a range of empirical staffing patterns that vary with respect to the use of NPs, PAs, and CNMs. The Joint Working Group noted the importance of including examples of both high and low use of these practitioners in the defined scenarios. Thus, we will endeavor to include a broad range of staffing patterns in the model so that the desired scenarios can be constructed.

Appendix C:

**Small Group Paper:
Issues for an Integrated Workforce**

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Executive Summary

The Workgroup on Primary Care Workforce Projections discussed two issues considered critical in developing an interdisciplinary health workforce: territorialism/power and collaboration.

Territorialism among the disciplines appears to be present more on the national or organizational level than at the clinical level. Nevertheless, a number of factors support its existence at all levels: parallel tracks of education, parallel documentation systems, fear of direct economic competition, duplicative tasks and functions in the provision of care, and political efforts to equate nursing with medicine. A key issue in territorialism is leadership, particularly in a team environment. In a collaborative (non-territorial) practice, leadership should be dynamic and based on patient needs and professional expertise. Leadership may change depending on circumstances. To ensure continuity and coordination of care and maintain accountability for care delivered, it is essential that every patient have an identified primary care provider. Leaders should aim for a collegial, rather than hierarchical, style. Within the team, professional ethics should be ensured. Particular points to be stressed are a focus on patient care, rather than team dynamics as such or service to the system; an understanding of limits of competence; the presence of checks and balances; responsibility; and commitment.

The Institute of Medicine's updated definition of primary care underscores the importance of a team approach in primary care delivery with collaboration between health professionals. Successful collaboration includes commitment, benefits for both patients and providers, consideration of the possible trade-offs involved in changing traditional authority structures, team-building skills, concern about efficiency and a discriminate focus for care, cross-training in clinical skills, acceptance of a fluid leadership structure, a true peer relationship that involves mutual respect, effective communication, and acceptance of evaluation of both team and individual performances. There may be a synergistic effect from collaborative practice, which achieves outcomes beyond those attained by primary care professionals practicing independently of each other. Education was viewed as key in developing collaborative relationships, since attitudes toward patient care, toward one's profession, and towards other professions are developed during that time. Students should learn to practice in an interdependent fashion. When developing educational programs, individuals and institutions should learn from efforts of the past.

I. Introduction

In the wake of failed federal attempts at health care system reform, marketplace forces and state initiatives are the leading forces in reshaping health care in the United States. Workforce issues have once again become central in health policy discussions. We are now acutely aware of the consequences of past inattention to primary care and face an oversupply of costly medical specialists. With the growing influence of managed care, cost containment has become central to the discussion of health care delivery. Health policy debate grapples with the complex issue of appropriate workforce numbers and composition, educational financing for health professions, and reimbursement for services. The continued lack of access to primary care services for segments of our population has spurred a critical reexamination of the roles, accountability, costs, and social responsibility of our nation's health professionals.

To examine primary care workforce issues and project workforce needs for the future in an integrated fashion, the Bureau of Health Professions (BHP) convened a Workgroup on Primary Care Workforce Projections, comprising representatives from the Council on Graduate Medical Education (COGME) and the National Advisory Council on Nurse Education and Practice (NACNEP), as well as a nurse practitioner, nurse midwife, and two physician assistants who served as ad hoc members. The collaboration of these two key national professional advisory councils and the process of interdisciplinary planning for an interdisciplinary workforce are landmarks for the health professions.

The workgroup had two equally important goals to complete between October 1994 and September 1995: first, to interact with a BHP-supported analytic contract to develop a computer model for projecting needs for primary care nurse practitioners (NPs), certified nurse midwives (CNMs), physician assistants (PAs), and physicians, and second, to comment on the qualitative issues involved in establishing a cooperative interdisciplinary workforce. Results for both objectives are presented in the *Final Report of the Workgroup on Primary Care Workforce Projections*, and the model is addressed in depth in the contractor's final report, which is appendix A to the workgroup's report. This paper addresses in detail workgroup deliberations on the second objective.

II. Issues

At its first meeting, the workgroup listed over thirty issues considered important for an interdisciplinary workforce. The following were considered high priority:

- Education for collaborative practice given expectations, the funding system, and competition for training sites
- Factors determining utilization of PAs, NPs, CNMs, and MDs, especially in managed care
- The definition of competency for primary care and principal providers

- Understanding how health care problems will drive the managed care system and education
- Sharing control and authority—what "independence" will mean in managed care
- Territorialism/power
- Health professions educational funding
- Working relationships in the professional system
- Enhancing the future of integrated models
- Specialty care

There were a wide variety of other areas mentioned, ranging from the role of regulation in the workforce to the future of NPs, CNMs, and PAs.

To most effectively address the issues, the workgroup divided into two smaller groups, with each focusing on only one priority issue. Small groups then reported back to the full membership to elicit additional discussion. The first group chose territorialism and power as its theme; the second chose collaboration. In December 1994, members suggested that papers be commissioned to bring focus to the discussions. The papers prepared by Drs. Baldwin and Fagin were presented in April 1995,¹ and summaries are presented as an introduction to the deliberations on the two issues.

III. Territorialism and Power

Dr. Baldwin's paper, "Territoriality and Power in the Health Professions," provided background for the workgroup's discussion. He defined territorialism as "the individual compulsion to possess and defend an exclusive domain against others" and suggested that several factors make territorialism prominent in the medicine-nursing relationship: gender differences, income differentials, areas of overlapping roles and functions, and in-house divisions and boundary issues. Even as the "territory" of medicine has increased over recent years, legal protections, legislative entitlements, and cultural legitimacy have placed physicians clearly in authority for the entire medical realm. Changes are already occurring regarding authority for health care. For example, medicine's professional dominance appears to be threatened by the cost concerns of corporate interests, and nurses have begun a process of self-determination, accompanied by accelerated professionalization. The environment is moving toward collaboration, but this must be accompanied by a return to true professionalism, wherein all elements that make one a professional—a body of systematic theory, client-recognized authority, broad community sanction, a code of ethics, and a professional culture—are geared toward serving the patient. An emphasis on professionalism is especially important in our changing health care delivery system. Re-engineering and cost containment efforts are focused on tasks and have diminished professional judgment and autonomy.

¹ The full text of the papers is presented in appendix A of the workgroup's final report.

In their deliberations, the workgroup discussed manifestations and causes of territorialism, factors that affect territorialism, power and leadership in an interdisciplinary environment, and professional ethics.

Conflict among the disciplines appears to be present more on the national or organizational level than at the clinical level. Physicians, PAs, NPs, and CNMs find collaboration easier when centered on the patient; for policy questions, however, each group tends to defend its own interests. One of the challenges for the workforce is to achieve the collaboration of national associations for the good of primary care.

In a discussion of territorialism, the evolution of the specific disciplines should also be considered. When the first physician assistant program was developed at Duke University in the late 1960s, it grew out of the medical program rather than the nursing program of that university and has historically followed the medical model in its practice. Nurse practitioner programs were developed at about the same time but began in schools of nursing and usually involved master's-level preparation. Concurrently with the development of these new professions, medicine was focusing on subspecialty training with the goal of improving health care. Nurse midwifery in the United States began in 1925 with the Frontier Nursing Service; the emphasis of educational programs was preparing public health nurses in midwifery. In the early to mid-1900s, midwifery in the United States was not allowed to enter the mainstream of health care, as it did in Europe.

Besides such parallel tracks of education, other factors support an attitude of territorialism:

- Fear of direct economic competition from different categories of practitioners
- Parallel documentation systems maintained by physicians and other practitioners
- Duplicative tasks and functions in the provision of care
- Political efforts to equate nursing with medicine

At the same time, market forces exist which force professionals to re-examine what duties lie within their "territory." In managed care, "offloading" is often observed, wherein tasks are given to the lowest level of provider that could competently provide the service. For example, if a primary care physician could do the work, then a specialist should not; if an NP or PA could perform the task, then a primary care physician should not. The workgroup did not endorse the concept of offloading, but simply recognized its influence and potential impact on collaborative practice.

The team structure found in managed care is becoming more and more common, and this raises the territorial issue of leadership. While the public may continue to view physicians as the best leaders due to their educational and clinical preparation, other professionals may be better suited for providing particular services, such as health promotion or home care. A fluid leadership structure may result, which is acceptable provided a specific individual serves as the patient's primary contact and is held accountable for that person's care. Whoever assumes

leadership—whether physician, NP, PA, or CNM—should know the limits of his or her competence and the point at which a referral is required. Additionally, as NPs, PAs, and CNMs begin to assume leadership more frequently, the legal scope of practice should be addressed.

Leadership deficiencies of the past may be related as much to the qualities and style of the leaders themselves as to the system. In health care and organizational settings, many tend to default to hierarchical relationships. Hierarchical leaders, who often manage by fear and intimidation, only reinforce the conflict of territorialism. Leadership is collegial when others naturally turn to an individual for guidance based on that person's skills and insights. A collegial manager spends 95 percent of his or her time inspiring and influencing, rather than issuing directives. Health care professionals need to be trained in team management and leadership skills.

Knowing one's limit of competence, ensuring that the patient has a primary contact—these are not only leadership issues, but also issues of professional ethics. Ethics requires that the focus of all professionals should be on patient care. The goal of a team is not to get along or to benefit the organization, but to best serve the patient. Often, if one is oriented to serving the system (whether an HMO, an association, the government, or a practice group), the patient suffers. If one is oriented to serving the patient, the system may suffer. Rewards are linked with serving the system, but professionalism requires that the patient come first. In line with serving the patient comes determining quality. The health care team is in the best position to develop quality standards, and they should do so before others develop standards for them.

Ethics also requires that the health care professional be responsible, committed, and collegial. Responsibility means that all are held accountable for their decisions. Commitment goes hand in hand with responsibility: it allows the patient to rely on his or her provider, and team members to rely on each other. *Collegiality, while a value in itself, is important to the ethics of health professionals because care of the patient demands it.* Team members must foster a collegial relationship and be able to negotiate and work through any tensions. At the same time, there should be checks and balances on the team. A dynamic tension, which displays the different foci or goals of each discipline (and should be distinguished from an emotional tension), can benefit the patient.

IV. Collaboration

The Institute of Medicine's (IOM) updated definition of primary care refers to "integrated, accessible health care services." A more detailed discussion of this concept in *Defining Health Care: An Interim Report* (IOM, 1994) underscores the importance of a team approach in primary care delivery with collaboration between professionals providing health services. Given the historical struggles for territory and power as previously discussed, how can health professions workforce relationships be developed that enhance the population's access to

comprehensive, quality, cost-effective primary care? In an era of cost containment, the assurance of such care must be the aim. Collaborative relationships between primary care providers that focus on achieving this goal of care more than the individual providers' personal needs facilitate success in meeting the challenges ahead.

In their deliberations, the workgroup received insight from Dr. Clair Fagin's paper, "Thoughts on Collaboration Between Physicians and Nurses." Although all evidence shows that collaboration leads to improved patient outcomes and more satisfied staff, Dr. Fagin indicated that it is still not being practiced in many places. Some expectations of the past are causing a conflict. For example, some in the nursing profession expect physicians to treat them only as assistants. Additionally, different degrees of collaboration are sought; physicians may believe the relationship to be collaborative to a great extent, while nurses perceive that same relationship as only moderately collaborative.

Dr. Fagin challenged the workgroup to consider new solutions to the problem, which has remained intransigent despite long-term efforts of foundations, professional associations, and individuals. She suggested that it may be best to work toward collaboration in the training stage, especially considering that both medical and nursing students come into their training with preset attitudes. However, interdisciplinary education at the preprofessional stage has not always been successful. Promising arenas for such education in the future may include community health and primary care. Additionally, models of successful collaboration, both in research and in clinical area, should be considered.

The workgroup then focused its discussions on two major themes: the concept of collaboration and introducing collaboration into educational settings.

After engaging in an extensive literature review on the subject of collaboration, the workgroup adopted the following working definition of collaboration, which was a modification of one offered by Phaneuf²:

Collaboration is a true partnership wherein mutual goal setting occurs, authority and responsibility for actions belong to individual partners, including a commitment to the belief that this collaborative relationship will enhance patient care outcomes.

This definition implies a team approach to patient care which recognizes the contributions of different team members and shared accountability for the care that is rendered. The focus here is on patient care outcomes, i.e., a focus on the "goal more than the role." In addition, the work of one professional could not be "substituted" by another provider; while some

² Phaneuf, M.C. *The Nursing Audit: Self Regulation in Nursing Practice*, 2nd ed. New York: Appleton-Century-Croft, 1976.

duplication of function exists, each discipline retains unique attributes that contribute in a different way to the care of the patient.

Having adopted this working definition of collaboration, several goals and elements of collaborative practice in primary care were identified. These characteristics are summarized below.

Of the goals and values related to collaborative practice, the ultimate is improved patient care as measured by efficiency, quality, and effectiveness. The provision of care from nursing and medical models through a collaborative approach to clinical practice can enhance the comprehensiveness and quality of care rendered. Indeed, there may be a synergistic effect from collaborative practice which achieves outcomes beyond those attained by health care professionals practicing independently of each other. The benefits of collaborative practice are not limited to patients. Professionals working in collaborative relationships can enjoy more satisfactory work environments with opportunities for continued professional growth and academic stimulation. With improved efficiency of care, opportunities for enhanced employment benefits and other incentives may be available.

What are the essential elements of collaborative practice? Perhaps most important is a commitment to making the professional relationship work accompanied by a sense of mutual respect and peer relationship among team members. With these elements, a sense of mutual trust can evolve over time. Professionals in collaborative relationships must be equipped with team-building skills and use flexibility in their approach to problem solving. Collaborative practice is facilitated by the identification of a common manager who assumes a leadership role on the team. Communication must be open and clear. Team efficiency is facilitated by a discriminate focus on care. At times, cross-training of team members may enhance operational efficiencies. As identified in the working definition of collaboration, there is a shared accountability for patient care outcomes. Collaborative practice also requires a willingness of team members to evaluate each other and to be evaluated.

The workgroup cited cost containment in health care as one of the major forces requiring the development of more collaboration in primary care practice today. Some practice environments are more conducive to collaborative practice than others. For example, community health centers are built on a team approach to patient care, whereas professionals in academic health centers function under separate lines of authority. Again, focusing on the goal of collaboration, i.e., improved patient care outcomes, more than the roles of health professionals themselves serves to facilitate collaborative practice.

Educational models are one barrier to collaborative teamwork. Students know what distinguishes them from students in other disciplines. They are less likely to understand the commonalities or know how to work interdependently for the good of the patient. Because of this, they need the opportunity to work with others. At the same time, educators should ensure that students have developed all of their areas of competence, so that they do not rely on

others to make up for any of their limitations. Interdisciplinary education will have the additional benefit of providing students with role models who collaborate with other health professionals.

The group suggested that any interdisciplinary education programs should be based on patient need and evaluated by patient outcome. They acknowledged the general barriers to interdisciplinary education, such as the separate funding streams. Perhaps graduate medical education could be changed to graduate health education and embrace different types of providers. Another obstacle is the expense involved in training in an ambulatory setting.

The workgroup recognized the many efforts toward interdisciplinary education and teamwork that have been initiated over the past few decades, including the National Joint Practice Commission, which brought together the American Medical Association and the American Nursing Association in the early 1970s and disbanded in the early 1980s, and the research projects presented in the annual Proceedings of the Interdisciplinary Care Team Conferences, which were begun in 1978. As Dr. Fagin stated in her paper, large-scale collaboration has been attempted but has not always been successful. It will be important, then, to learn from the past.

V. Conclusion

Perhaps the historic struggles related to territorialism and power issues between the professions and the need to move to more collaborative models of care is best summarized by Baldwin:

What will be needed are earnest discussions concerning the nature of clinical work and the definition of clinical tasks and roles in rational and functional framework, focused on patient care and uncontaminated by organizational agendas. The path will be guided by refocusing on the needs of the patient—not on the images or ambitions of the professional associations. There must be a return to the goals and motivations of those in the helping professions—service. Self interest and self-serving must give way to the needs of society. Only in this way will the public—in whom the power is ultimately invested—act to curb the potential excesses of the new health bureaucracy and once more support the claims of professions to better serve them (p. 21).

VI. Recommendations

Based on its observations and the needs identified, the workgroup developed three strategic aims that would help the workforce become more collaborative and less territorial:

1. A new systems approach to the delivery of health care services and collaboration of health care personnel at all levels, i.e., clinicians, educators, professional associations, and insurers.

Rationale: Parallel documentation systems and duplicative tasks for physicians and nurses are two examples of how the system works against collaboration, as well as against effective patient care. Additionally, conflicts occur most often in an administrative environment, and these attitudes filter down. New approaches are needed at these broad levels to effect change.

2. A shift in the focus of workforce development to reflect the health care needs of the population, with a particular consideration of vulnerable groups.

Rationale: As planners and policy makers cannot build projections based on the status quo, neither can professionals discussing issues required for effective interdisciplinary workforce make these assumptions. The population may require more health promotion, for which the nurse practitioner, for example, may be the best team leader. The population most certainly requires a workforce that reflects its ethnic and racial diversity, and this was considered a priority area for the workgroup. The shift is basic and critical.

3. Revitalization and reorientation of health care providers' education and practice to meet the challenges of a changing health care delivery system, while assuring the delivery of quality care.

Rationale: Attitudes develop in educational settings, so students must be formed with an understanding of the collaborative environment required for patient care. This must carry over into practice. Training may be required for practitioners of all levels and of all ages, since there has been an paradigm shift from independent practice to interdependent practice.

Based on these overriding aims, the workgroup offered specific proposals for several audiences: the Federal Government, professional associations and educational institutions, health care organizations and administrators, COGME and NACNEP, and individual professionals.

I. The Federal Government should:

1. Provide technical assistance to assist States and other entities in evaluating their existing health care services and planning for future needs. Such assistance, in the form of data systems and information resources, would aid in identifying gaps in the provision of services and assist in planning for an appropriate mix of skills and responsibilities to meet health care needs of the future. In providing such assistance, the Government should provide guidelines and expected outcomes.

2. Encourage the participation of health care professionals in the development of policies and the exploration of issues related to the provision of health care services and other health policy issues.
3. Continue to support the development of innovative, cost-effective programs for the education and practice of health care professionals, especially those related to the development of collaborative efforts in education and practice.
4. Support health services research concerned with the outcomes of collaborative practice.

II. Professional associations and educational institutions should:

1. Develop and support research projects addressing collaborating education and disseminate the findings.
2. Develop strategies to implement and evaluate innovative education and practice models for collaborative practice and report the results.
3. Encourage the development of collaborative practice models that (a) identify core competencies in health and social sciences that are common to all health care professionals; (b) identify unique competencies for each profession; and (c) examine the implications of these findings for education and practice.
4. Develop and evaluate health information systems that facilitate collaborative models of care.
5. Recognize the patient/family as full collaborative members of the health care team.

III. Health care organizations and administrators should:

1. Develop and evaluate health information systems that facilitate collaborative care.
2. Provide for and encourage the collaborative involvement of health providers in quality assurance through peer review activities and outcomes-based health service research.
3. Encourage the efficient utilization of health providers and enhanced patient care outcomes through collaborative models of care.
4. Utilize collaborative teams of providers within larger organizations to ensure personal, individualized approaches to patients and their families.

IV. COGME and NACNEP should:

1. Continue to identify and investigate health policy issues as they relate to the health care workforce and health care delivery.
2. Continue the collaborative COGME/NACNEP workgroup efforts, including support for meetings and dissemination of workgroup documents and recommendations.
3. Provide opportunities for the discussion of relevant health workforce issues by experts in the field; encourage the participation of professional associations and other interested organizations in these deliberations to facilitate a compatible working environment.

V. Individual professionals should:

1. Empower patients and families to take responsibility for their care.
2. Seek out and develop collaborative practice opportunities to promote cost-effective quality care.
3. Develop team building and collaborative practice skills through continuing professional education activities.
4. Maintain a focus on the goal of collaborative practice, i.e., improved patient care outcomes and service delivery.

VI. Acknowledgements

This paper was prepared by Diane Hanna, RNC, MS, FNP and James Cawley, M.P.H., PA-C. Editorial assistance was provided by TASCAN, Inc., and the staff of the Division of Nursing and the Division of Medicine, BHP.

Appendix D:

**Annotated Bibliography:
Workgroup on Primary Care
Workforce Projections**

Annotated Bibliography

Advisory Group on Physician Assistants and the Workforce. *Physician Assistants in the Health Workforce: 1994.* Health Resources and Services Administration, Bureau of Health Professions, Division of Medicine, Special Projects and Data Branch: Washington, DC, December 1994.

This report, which was submitted to the Council on Graduate Medical Education (COGME), examines the role and use of physician assistants (PAs) in medical practice with primary care and specialty physicians. In reviewing the current status and practice activities of the 23,350 actively practicing PAs, the report seeks to define the parameters of the practice roles of PAs, both currently and in the context of health care reform; assess current and potential use patterns of PAs in five specific health care delivery roles; describe the educational process for PAs and the capacity of PA programs to produce increased numbers of graduates to accommodate expected demand projections; recommend factors to be taken into account in examining and developing projections of the number of PAs and the impact of those projections, develop assumptions underlying the determination of requirements; evaluate the impact of PA supply and use trends on future physician workforce requirements; and make final recommendations to COGME. 120 pp., 190 refs., 6 appendices.

Aiken, L.H., and Salmon, M.E. *Health Care Workforce Priorities: What Nursing Should Do Now. Inquiry 31:318-329, 1994.*

This article provides an appraisal of the adequacy of the aggregate supply of nurses and the appropriateness of their educational mix in view of anticipated changes in health care. The authors identify five priority areas in which nursing can make particularly important contributions to improving health and health care: restructuring hospitals, improving primary care availability, contributing to the viability of academic health centers, improving care of the underserved, and redesigning the role of public health in a reformed health care system. 12 pp., 43 refs.

Aiken, L.H., and Gwyther, M. *Medicare Funding of Nurse and Paramedical Education: Final Report.* Center for Health Services and Policy Research, University of Pennsylvania: Philadelphia, PA, March 1994.

This report questions whether the policy that guides Medicare funding for nursing and paramedical education is consistent with current education trends and work force needs. The authors describe the intent of Medicare's initial policy on education funding, review changes in policy since the program's inception, and analyze

education and work force data on nurses and allied health professionals. The potential impact policy changes would have on education programs, hospitals, and on the few states now receiving the majority of available funds is discussed. This report was prepared for the Office of the Assistant Secretary for Health, U.S. Department of Health and Human Services. 43 pp., 45 refs., 9 tables, 3 appendices.

Cawley, J.F., and Emelio, J. Final Report of the Advisory Group on Physician Assistants in the Workplace. In: *Perspective on P.A. Education* [newsletter]. Williams and Wilkins: Baltimore, Summer 1994.

The Advisory Group on Physician Assistants in the Workplace was commissioned by COGME in 1993. This final report presents findings on the present status of the Nation's 59 accredited PA programs, reviews the adequacy of PA program support, and provides estimates of the capacities of PA programs to increase annual graduate output under various health reform scenarios. 3 pp.

Clawson, D. K., and Osterweis, M., eds. *The Roles of Physician Assistants and Nurse Practitioners in Primary Care*. Association of Academic Health Centers: Washington, DC, 1993.

This volume is based on a workshop conducted by the Association of Academic Health Centers, which brought together 35 health care leaders, policy experts, and analysts to examine the educational, professional practice, and public policy issues that impact the ability of PAs and NPs to deliver primary care services. It includes nine contributed papers. 128 pp., 183 refs.

Council on Graduate Medical Education. *Fourth Report to Congress and the Department of Health & Human Services: Recommendations to Improve Access to Health Care Through Physician Workforce Reform*. January 1994.

Based on data in the Third Report, COGME's Fourth Report provides policymakers with specific legislative recommendations for the physician workforce. These recommendations are designed to utilize public funds which support GME to achieve the needed number and specialty mix of physicians; provide incentives to increase the number of minority graduates, to increase interest in generalist careers, and to improve geographic distribution; and assist educational institutions in expanding their primary care capacity. A focus of the proposal is that funds and slots would be allocated through medical school-coordinated GME consortia. The report discusses the impact of COGME's recommendations and specific options for implementation. 28 pp., 49 refs., 13 figs., 6 tables.

Council on Graduate Medical Education. *Improving Access to Health Care Through Physician Workforce Reform: Directions for the 21st Century. Third Report.* October 1992.

COGME's Third Report presents its seven findings related to deficiencies in the current physician supply, medical education financing, and health care reimbursement systems. Based on these findings, the Council made recommendations for the Nation and, specifically, for medical educators. 70 pp., 345 refs., 26 figs., 2 tables, appendix.

Department of Health and Human Services, Office of Inspector General. *Enhancing the Utilization of Nonphysician Health Care Providers.* Publication No. OEI-01-90-02070, May 1993.

This report identifies and describes approaches that some organizations are using to make better use of nonphysician providers. It describes fundamental barriers that inhibit the broader use of such approaches. The report closes with three ways that the Public Health Service could take advantage of the opportunity to strengthen its national leadership role in encouraging more productive use of health personnel. 21 pp., 35 refs.

Department of Health and Human Services, Office of Inspector General. *Enhancing the Utilization of Nonphysician Health Care Providers: Three Case Studies.* Publication No. OEI-01-90-02071, May 1993.

This companion report provides detailed case studies of three institutions: Evercare in Minneapolis, St. Joseph's Hospital in Atlanta, and Mercy Hospital and Medical Center in Chicago. For each case, the following information is provided: background; a description of the innovation; an assessment of its impact on quality of care, costs, physicians, staff, and the organization; limitations and implementation impediments; and conclusions. The report closes with lessons learned from the three studies. 27 pp.

Dunham, N.C., Kindig, D.A., and Libby, D. Wisconsin's Future Requirements for Generalist Physicians: Is the State's Training Capacity Sufficient? *Wisconsin Medical Journal*; (Jan):13-18, 1995.

Using the State of Wisconsin as an example, this article examines the issues surrounding the discrepancies in the numbers of generalist and specialist physicians, with particular emphasis on the effect of managed-care and fee-for-service health plans on these numbers. The authors question the effectiveness of Federal efforts to increase the number of medical students who choose to become generalists, to increase the

level of training they receive during residency, and to recruit more generalist physicians into rural areas. In closing, it is suggested that a relatively low generalist population does not necessarily translate into a need to expand this population. 4 pp., 13 refs.

Eisenberg, J.M. If Trickle-Down Physician Workforce Policy Failed, Is the Choice Now Between the Market and Government Regulation? *Inquiry* 28:241-249, Fall 1994.

Dr. Eisenberg's article focuses on the challenge of achieving the right mix of physicians to serve the health needs of the Nation. He discusses the marketplace, teaching hospitals, the funding of residency training, market and regulatory approaches to meet the goal, and prospects for reform. 9 pp., 12 refs.

Fagin, C.M. Collaboration Between Nurses and Physicians: No Longer a Choice. *Academic Medicine* 67(5):295-303, 1992.

This essay deals with the phenomenon of collaboration, compelling reasons to promote collaboration, the barriers that exist between nurses and physicians in achieving collaborative relationships, and strategies to promote change. Comments of experienced observers and summaries of the pertinent research literature are presented. 9 pp., 24 refs.

Graham, O.C., Harnett, N.E., Harrison, E. and Considine, E. Collaborative Research. *Journal of Neuroscience Nursing* 26(2):121-123, 1994.

This article describes a collaborative study conducted by physicians and nurses at the National Institute of Neurological Disorders and Stroke of the National Institutes of Health on the treatment of patients with Gaucher's disease. Much of the article is devoted to a review of the disease and the study; information about the collaborative process used in the study is brief, positive, and mostly anecdotal. 3 pp., 24 refs.

Henderson, T. and Chovan, T. Removing Practice Barriers of Nonphysician Providers: Efforts by States to Improve Access to Primary Care. *Intergovernmental Health Policy Project*, George Washington University: Washington, DC 1994.

This report is a state-by-state appraisal of the recently intensified Nationwide debate over the role of so-called nonphysician providers in increasing the availability of primary health care. Nonphysician providers include nurse practitioners (NPs), physician assistants (PAs), and certified nurse-midwives (CNMs), all widely touted as

a practical augmentation to primary care, particularly among the medically underserved. The authors also devote considerable time to delineating and defining the barriers — educational, legal/regulatory, economic/financial, public and professional — facing nonphysicians. In a tabular format showing each state, the authors provide data on the legislative authority, prescriptive privileges, and reimbursement regulations governing nonphysicians. While the authors are not necessarily opposed to the increased role of nonphysicians in primary care, they do conclude that the long-term economic benefit of more nonphysician providers to the primary care workforce is open to question. 84 pp., 4 refs, 4 appendices.

Hoffman, C. Medicaid Payment for Nonphysician Providers: An Access Issue. *Health Affairs*: pp. 140-152; Fall, 1994.

This article examines what the author calls "the patchwork of policies" governing Federal Medicaid payments to nonphysicians and how Federal mandates have led many states to evaluate payment policies for nonphysicians and their potential effect access to primary and maternal care services. Beginning in 1977, with the passage of the Rural Health Clinic Services Act, Congress mandated Federal policies governing the payments to non-physicians. The author goes on to discuss how subsequent changes in Federal policy affected payments to physician assistants and certified nurse-midwives, and outlines results of the 1992 Physicians Payment Review Committee/ Inter-governmental Health Policy Project (PPRC/IHPP) survey in which state medicaid officials were asked to respond to questions concerning payment for nonphysician services, fee levels, and specific policies detailing service or practice setting restrictions. The author concludes that in many states the barriers — economic and otherwise — are still very strong and that any policy designed to improve access to these services must address every aspect of those barriers. 13 pp.

Iglehart, J.K. Health Care Reform—The Role of Physicians. *The New England Journal of Medicine* 330(10):728-731, 1994.

This brief article reviews the politics of reform, the search for compromise, the effects of reform on the medical profession, the attitudes of policy makers, the divisions among physicians, and the challenge facing medicine. 4 pp., 12 refs.

Iglehart, J.J. Health Care Reform and Graduate Medical Education. *The New England Journal of Medicine* 330(16):1167-1171, 1994.

Dr. Iglehart reviews President Clinton's proposal for nationally coordinated planning of the physician workforce and the efforts of various interest groups to reduce the

number of doctors trained, redress the imbalance between generalists and specialists, and change the financing and location of graduate medical education. 5 pp., 24 refs.

Institute of Medicine. *Defining Primary Care: An Interim Report*. National Academy Press: Washington, DC, 1994.

This first report of the Committee on the Future of Primary Care from the Division of Health Care Services, Institute of Medicine, provides a new definition of primary care, reviews earlier definitions, explains the terms of the definition, discusses means to achieve the goals of primary care as defined, and lists issues to be addressed in the final report. 42 pp, 24 refs.

Kassirer, J.P. What Role for Nurse Practitioners in Primary Care? *The New England Journal of Medicine* 330(3):204-205, 1994.

Dr. Kassirer wrote this editorial as a response to Dr. Mundinger's article "Advanced-Practice Nursing—Good Medicine for Physicians?" which was published in the same issue of the journal (see Mundinger's bibliographic entry). He presents critiques of the OTA report and of the data used by nurses to support their claim of being able to provide primary care services of the same quality as physicians. He closes by suggesting that expanding the role of NPs may be a regrettable step. 2 pp., 23 refs.

Kindig, D.A. Interdisciplinary Education for Primary Health Care Team Delivery. *Journal of Medicine Education* 50(12):97-110, Part 2, 1975.

The article offers guidelines for design and implementation of interdisciplinary education programs aimed at teaching primary health care team delivery. The guidelines are preceded by a history of the development of the primary health care team approach, a question-and-answer section that clarifies the definition of the team approach, and a review of university programs that have implemented interdisciplinary education for primary health care team delivery. 13 pp., 29 refs.

Kindig, D.A. *What Does the Literature Tell Us About the Potential and Feasible Substitution of Nonphysician Providers for Physicians? A Policy Perspective*. Robert Wood Johnson Foundation, Dec. 10, 1993.

The focus of this review is the evidence for the cost-effective substitution of nonphysician providers (NPPs) for physicians. It covers definitional issues, NPP substitution and productivity, the cost-effectiveness of NPPs, and recent experience

from Federal programs and HMOs and ends with eight conclusions and 14 areas for additional research. 65 pp., 38 refs., 12 appendices.

Kindig, D.A. PAs in a Reformed Health Care System. *Journal of the American Academy of Physician Assistants* 7:391-392, 1994.

This brief editorial suggests that there will be an oversupply of physician specialists but that it may be appropriate for PAs to explore specialty roles, while not abandoning their historic role in generalism and in underserved areas. He briefly discussed cost issues, specifically the substitution of PAs for residents and salary ratios. Dr. Kindig suggests that the team arrangement is useful not only for special circumstances, such as remote areas or underserved populations, but also for the entire system. 2 pp., 2 refs.

Kindig, D.A. Counting Generalist Physicians. *The Journal of the American Medical Association* 271(19):1505-1507, May 18, 1994.

In this article, Dr. Kindig presents a framework for counting physicians. He discusses interpretation of data, use of data, analytic issues, and a proposed definition of generalist production. He concludes by suggesting research efforts or changes in the data to allow full-time equivalent estimates of specialty and type of activity. 3 pp., 18 refs.

Kindig, D.A., and Libby, D. How Will Graduate Medical Education Reform Affect Specialties and Geographic Areas? *The Journal of the American Medical Association* 272(1):37-42, July 6, 1994.

This study projects specialty and geographic impacts of workforce reform proposals on the practice output of graduate medical education, making use of a demographic life-table model. Results show that, if GME input is reduced to 100 percent of U.S. medical graduates with 55 percent entering practice as generalists (excluding OB/GYN), the total number of first-year positions would decline from 24,443 to 18,783 and the total number of residents would decline from 103,858 to 80,699 at equilibrium. Achieving national goals of reduced aggregate physician production, reduced specialty supply, and generalist increases will require significant alterations in the GME pool. 6 pp., 20 refs.

Kindig, D.A., Cultice, J.M., and Mullan, F. The Elusive Generalist Physician—Can We Reach a 50% Goal? *The Journal of the American Medical Association* 270(9):1069-1073, September 1, 1993.

The authors use the Bureau of Health Professions' aggregate physician supply model to forecast the generalist-specialist balance. They outline the findings and discuss their implications on aggregate physician supply and on policy initiative affecting the ratio of generalists to specialists. 5 pp., 32 refs.

King, L., and Lee, J.L. Perceptions of Collaborative Practice Between Navy Nurses and Physicians in the ICU Setting. *American Journal of Critical Care* 3(5):331-336, 1994.

This article describes a study of how the doctors and nurses of a Navy intensive care unit perceive and experience collaborative practice. The authors determined that collaborative practice had occurred when physicians and nurses could use cooperative/assertive behavior to resolve conflicts. The study revealed that both nurses and physicians perceived that collaborative practice occurred at a moderate level, with physicians perceiving greater levels than nurses. The authors recommend areas for clarification by further studies. 5 pp., 33 refs., 2 figs.

Knickman, J.R., Lipkin, M., Finkler, S.A., et al. The Potential for Using Nonphysicians to Compensate for the Reduced Availability of Residents. *Academic Medicine* 67:429-438, 1992

This article outlines the results of a 1988 time-motion study conducted by the authors on eight internal medicine residents at two New York City hospitals as a basis for considering nonphysicians a source of alternative staffing in teaching hospitals. In the study residents' activities were observed, coded, and classified into activities that 1) had to be performed by a physician, 2) were educational only, or 3) could be done by a nonphysician. After analyzing and projecting the data collected and providing detailed breakdowns, the authors estimate the kinds and numbers of nonphysician health-care professionals who would be needed as substitutes for residents. In conclusion, the authors foresee possible difficulties in implementing such substitutions. 10 pp., 20 refs.

Krieger, G.F. Physicians vs. Nurses: The Public Battle Must Stop. *American Medical News*, April 18, 1994.

Dr. Krieger argues that the battle between nurses and physicians makes a mockery of the team approach, threatens the core of professionalism in health care, and ultimately harms patient care. He encourages mutual respect and appreciation, as well as communication. 2 pp.

Krueger, N.E., and Mazuzan, J.E., Jr. A Collaborative Approach to Standards, Practices: Setting the Stage for Continuous Quality Improvement. *AORN Journal* 57(2):467-480, 1993.

The authors of this article report that redesign of their facility's policies and procedures manual enhanced collaborative practice and quality control. The authors demonstrate that listing the responsibilities of different disciplines in the Standards and Practice Manual enhanced each worker's awareness of responsibilities in other disciplines. Reporting each task or procedure performed by workers from several disciplines on the same document improved communication and problem solving among disciplines. Several graphic presentations showing elements of the computerized manual are provided. 10 pp., 8 refs., 5 figs.

Larson, P.F., Osterweis, M., and Rubin, E.R., eds. *Health Policy Annual IV: Health Workforce Issues for the 21st Century*. Association of Academic Health Centers: Washington, D.C., 1994.

This book addresses the public policy environment and the factors, criteria, processes, and rationale that contribute to the making and implementation of policy. It examines myriad policies and practices related to the people who will deliver services in the next century, from recruitment and retention of students and faculty in various health professions to changing roles for practitioners in the community and home care settings of the future. The first chapter is an article by Christopher McLaughlin on health workforce issues and policymaking roles. The following seven chapters examine a topic by providing abstracts of articles and commentaries. 206 pp., 83 refs.

LeRoy, L. The Cost-Effectiveness of Nurse Practitioners. In: *The Contribution of Nurse Practitioners to American Health Care*. pp. 295-314.

This complete discussion of cost-effectiveness examines the services NPs are qualified to provide, performance quality, productivity, task delegation experience, changes in physician practice behavior after the introduction of NPs, employment costs, impact on

average expenses per patient visit, training costs, price effects, and revenue generating ability. 20 pp., 87 refs.

Levinson, D. Sounding Board: Roles, Tasks, and Practitioners. *New England Journal of Medicine* 296(22):1291-1293, 1977.

In response to the role confusion that has accompanied the advent of PAs and APNs, Dr. Levinson promotes definition of practitioners by task rather than by role. He advances a standard basic-education curriculum for physician and nonphysician practitioners to impart a basic level of expertise, briefer recertification examinations oriented toward specific tasks rather than broad areas of knowledge, and equal pay for equal tasks. Dr. Levinson cites benefits of a task-oriented designation, including improved quality control and an increased capacity for administrators to assess the services their facility can provide. The author reports that among the problems of implementing such a system are unwieldy lists of tasks, disruption of the operations of small group practices, and psychological resistance. 3 pp., 6 refs.

Mechanic, D., and Aiken, L.H. Sounding Board: A Cooperative Agenda for Medicine and Nursing. *New England Journal of Medicine* 307(12):747-750, 1982.

This article identifies sources of contention between physicians and nurses and recommends measures to improve collaboration. Areas of concern include the changing roles of women and widening disparity in income between physicians and nurses. Another concern is an increase in responsibilities for nurses resulting from a more demanding health care environment, without a concurrent increase in authority and with a concurrent decrease in physician availability in the patient care setting. Still other concerns include conflict over reimbursement resulting from the introduction of nonphysician practitioners; high turnover among nurses, with a resultant loss of continuity; and increasingly separate education experiences. Recommendations include joint education ventures and use of senior physicians and nurses as role models. 4 pp., 18 refs.

Mundinger, M.O. Advanced-Practice Nursing—Good Medicine for Physicians? *The New England Journal of Medicine* 330(3):211-214, 1994.

In this "Sounding Board" contribution, Dr. Mundinger states that the literature supports the fact that NPs can provide primary care at a level equivalent or superior to that provided by physicians. She argues that primary care no longer requires the level of training that it once did and that the best model for physician-NP interaction is a collaborative model. Collaboration will allow both providers to make use of their

strengths. The team approach is good for the Nation, in terms of cost-effectiveness, training, and supply of providers. 4 pp., 30 refs.

National Advisory Council on Nurse Education and Practice. *Report to the Secretary of Health and Human Services on Workforce Projections for Nurse Practitioners and Nurse Midwives.* Health Resources and Services Administration, Division of Nursing: Washington, DC, May 1994.

This report presents projections of NP and CNM workforce requirements for a variety of settings—ambulatory care, hospitals, student health service, nursing home/extended care facilities, and prisons—and for three different scenarios of health care reform. The Council offered six recommendations. 53 pp., 26 refs., 3 appendices.

Nichols, L.M. Estimating the Costs of Underutilizing Advanced Practical Nurses. *Nursing Economics* 10(5): 343-345, 348-351, 1992.

This article provides an empirical model for estimating what the author describes as the very high cost of underutilizing nurses in advanced practice. Nurses in advanced practice are defined to include nurse practitioners, clinical nurse specialists, certified nurse-midwives, and certified nurse-anesthetists. Numerical requirements for implementing the presented model, including examples, are also provided. The author acknowledges that the reasons for the underuse of these nonphysicians are many, including legal scope of practice restrictions, delegation and reimbursement policies, and size of training programs. He also notes that the model he proposes can be applied to other nonphysicians as well as some generalist physicians versus specialists. Moreover, the author believes that the framework of, and the resulting cost estimates from, this model could be of interest to researchers and policymakers in estimating the cost of existing scope of practice and supply restrictions. The author concludes that by graphically demonstrating the cost of underuse of nonphysicians, policymakers may be more inclined to rethink some of the current restrictions. 7 pp., 39 refs.

Office of Technology Assessment. *Health Care in Rural America.* (OTA-H-434). United States Congress: Washington, DC, 1990.

This report is about access to basic health-care services by people in rural America. It begins by noting that although only about 27 percent of the U.S. population live in nonmetropolitan counties, rural populations are unique in that they encounter physical barriers when they attempt to access basic health care. These barriers include, but are not limited to, lack of public transportation and few local providers to choose from. The report outlines the four basic types of Federal Programs available to address this

problem: Medicare and Medicaid; the health block grant; federally funded rural health resources; and coordinating, undertaking, and funding research on rural health topics. The report also reviews 29 other specific options for Federal action to address rural health services, facilities, and personnel, with special emphasis on Maternal and Infant Care and Mental Health Care. 32 pp., 37 refs.

Physician Payment Review Commission. Chapter 14: Nonphysician Practitioners. In: *Annual Report to Congress*. 1994.

Chapter 14 of this report lists the Commission's four recommendations on nonphysician providers and discusses professional characteristics and roles and the effect on health system reform on these providers. 23 pp., 19 refs., 11 tables.

Record, J.C., McCally, M., Schweitzer, S.O., Blomquist, R.M., and Berger, B.D. New Health Professions After a Decade and a Half: Delegation, Productivity, and Costs in Primary Care. *Journal of Health Politics, Policy and Law* 5(3):470-497, 1980.

This early article discusses knowledge of the performance and potential contribution of new health practitioners (NHPs) after 15 years of their existence, presenting empirical data on delegation, productivity, and costs. It concludes that the NHPs appear to perform a large percentage of primary care services at a high level of quality and productivity and that the gap between the physician/NHP substitution ratio and cost ratio seems wide enough to ensure cost savings. 28 pp., 66 refs.

Rivo, M.L., Saultz, J.W., Wartman, S.A., and DeWitt, T.G. Defining the Generalist Physician's Training. *Journal of the American Medical Association* 271(19):1499-1504, May 18, 1994.

This paper from COGME determines the extent to which various specialties prepare residents in primary care competencies by reviewing data sources, compiling a list of 60 training components, and using the requirements of training to determine how the components were met. The authors conclude that family practice, internal medicine, and pediatric programs prepare residents in the broad competencies necessary for primary care practice. They recommend that residency programs require training in 90 percent or more of the 60 components, 50 percent or more of the components in each of the seven categories in which the components are divided, and a continuity of care experience for a panel of patients during at least 10 percent of the residency training period. 6 pp., 32 refs.

Schmitt, M.H., Farrell, M.P., and Heinemann, G.D. Conceptual and Methodological Problems in Studying the Effects of Interdisciplinary Geriatric Teams. *The Gerontologist* 28(6):753-764, 1988.

In order to illustrate the difficulties involved in conducting research on the effectiveness of interdisciplinary health care teams, this article presents a review of recent studies on that topic. For example, the studies reveal that inconsistent definitions and assumptions are incorporated in study results. A concise summary of the studies reviewed, presented in tabular form, includes descriptions of weaknesses in method and/or concept in each study. 11 pp., 32 refs., 1 table.

Schroeder, S.A. The Latest Forecast: Managed Care Collides with Physician Supply. *The Journal of the American Medical Association* 272(3):239-240, July 20, 1994.

Dr. Schroeder comments on Dr. Weiner's article "Forecasting the Effects of Health Reform on US Physician Workforce Requirement: Evidence From HMO Staffing Patterns," which was published in the same issue of *JAMA* (also included in the bibliography). 2 pp., 14 refs.

Sekscenski, E.S., Sanson, S., Bazell, C., Salmon, M., and Mullan, F. State Practice Environments and the Supply of Physician Assistants, Nurse Practitioners, and Certified Nurse-Midwives. *New England Journal of Medicine* 331:1266-1271, November 10, 1994.

The authors analyze variations in the regulation of NPs, PAs, and CNMs in all 50 States and the District of Columbia. Using a 100-point system, they assign numerical values to specific characteristics of the practice environment in each State and calculate coefficients for the correlation of summary measures of these values within States with estimates of the supply of practitioners per 100,000 population. Wide variations are found among States. Results also show that favorable practice environments are strongly associated with a larger supply of these practitioners. 6 pp., 34 refs.

Silver, H.K., and Hector, J.A. The Pediatric Nurse Practitioner and the Child Health Associate: New Types of Health Professionals. *Journal of Medical Education* 45:171-176, 1970.

This article, which describes early University of Colorado training programs for pediatric nurse practitioners and "child health associates," was written by two physicians when the phenomenon of nonphysician practitioners was relatively new. In extolling the benefits of nonphysician practitioners, the authors cite results of

evaluations showing high levels of nonphysician-practitioner competence and patient/family satisfaction with care rendered by nonphysician practitioners. The authors call for increased use of nonphysician practitioners to alleviate the problem of inadequate health care in certain socioeconomic and geographic sectors of the population. 6 pp., 3 tables.

Simborg, D.W., Starfield, B.H., and Horn, S.D. Physicians and Non-Physician Health Practitioners: The Characteristics of Their Practices and Their Relationships. *American Journal of Public Health* 68:44-48, 1978.

To evaluate and measure the differences between practitioner types in the care of patients, the authors of this article studied six primary care practices that use both physicians and nonphysician practitioners. In examining 1,369 patient-practitioner encounters the authors noted that physicians identified fewer symptoms and signs in their patients and prescribed fewer non-drug therapies than did nonphysicians. In terms of interaction between practitioners, the highest follow-up rate for all types of problems and therapies occurred when the same practitioner saw the patient at two successive visits to the same clinic. Conversely, when a physician saw a patient following a previous visit to a nurse practitioner, there was a significant drop in the follow-up rate of problems and therapies. Based on these findings, the authors conclude that although the skills of physicians and nonphysician practitioners are potentially complementary, the potential benefits of working together are not being fully exploited, particularly by physicians. 5 pp., 15 refs.

Sox, H. Quality of Care by Nurse Practitioners and Physician's Assistants: A Ten-year Perspective. *Annals of Internal Medicine* 91:459-468, 1979.

In this article the author analyzes twenty-one studies in which in-office, supervised care provided by nurse practitioners or physician's assistants was directly compared with care given by physicians. Although the author acknowledges that any conclusions cannot be extended to unsupervised care outside the office or to the care of seriously ill patients, the study does support the contention that the quality of care provided by nonphysician practitioners is comparable to that provided by physicians. 10 pp., 56 refs.

Spitzer, W.O. The Nurse Practitioner Revisited: Slow Death of a Good Idea. *New England Journal of Medicine* 310(16):1049-1051, 1984.

In this 1984 editorial, Dr. Spitzer comments on the progress of the NP concept, noting that the lack of legal claims against NPs suggests lack of widespread substandard

practice and that patients have expressed their satisfaction with these practitioners. However, he states his belief that the prognosis for NPs is poor based on fighting about turf, status, role, monetary ambitions, and education. 3 pp., 28 refs.

Spitzer, W.O., Sackett, D.L., Sibley, J.C., Roberts, R.S., et al. The Burlington Randomized Trial of the Nurse Practitioner. *New England Journal of Medicine* 290:251-256, 1974.

This article reports on a trial-study to assess the effects of substituting nurse practitioners for physicians in primary-care practice. The study was conducted from 1971 to 1972 in a large suburban Ontario practice. The health status of patients who received conventional care from family physicians was compared, both before and after the trial, to the health status of patients who received care mainly from nurse practitioners. Although the quality of care seemed similar and satisfaction was high among both groups of patients and professional personnel, the new method of primary care was not financially profitable to doctors because of current restrictions on reimbursement for the nurse-practitioner services. 6 pp., 30 refs.

Steele, J.E. ed. Issues in Collaborative Practice. *Grune and Stratton, Inc., Orlando: pp. 3-14, 1986.*

This article presents a detailed overview of the issues surrounding collaborative practice. These issues include: changing traditions, authority to practice, reimbursement, audit, education, research, and organizational relationships. The author, who is an RN, begins by restating the general definition of collaborative practice: the cooperative working relationship between physicians and nurses, although it can involve other members of the health care team. She then discusses the basic elements of joint-collaborative practice and the special ingredients for nurses if they are to succeed in these ventures. Collaborative practice requires health care professionals who work together to determine, with input from the patient, what directions care will take. However, the potential for collaboration, especially between doctors and nurses, has aroused mixed feelings. The author acknowledges that the issues raised by the evolutions of professional practice need examination and resolution; she also stresses that delivery systems that foster cooperative dialogue and collaborative relationships around patient care issues will be critical to quality health care services. 16 pp., 11 refs.

Stoddard, J.J., Kindig, D.A., and Libby, D. Graduate Medical Education Reform: Service Provision Transition Costs. *JAMA* 272(1):53-58, 1994.

This article addresses the issues surrounding graduate medical education reform and analyzes the potential strategies and costs of house staff substitution under a reformed system. Using two scenarios for substitution, residents and fellows, the authors base their analysis on two economic models: a lower-cost model, under which nonphysician providers assume many house staff responsibilities with additional aspects of their workload assumed by staff physicians, nurses, and ancillary personnel; and a higher-cost traditional model that relies more heavily on staff physicians to replace house officers. Although graduate medical education reform is likely to result in long-term cost savings, the authors conclude that any changes will necessitate transitions in service provision that are likely to generate some new costs in the short term. 6pp., 41 refs.

Strelnick, A.H., Bateman, W.B., Jones, C., Shepherd, S.D., et al. Graduate Primary Care Training: A Collaborative Alternative for Family Practice, Internal Medicine, and Pediatrics. *Annals of Internal Medicine* 109:324-334, 1988.

This article begins by reviewing the development of primary care in the United States and the confusion that grew around this discipline as each medical specialty applied its own definition. The authors describe a collaborative residency program in social medicine at Montefiore Medical Center that integrates three primary care specialties: family practice, internal medicine, and pediatrics. Followup of graduates reveals that participants choose to practice primary care and to serve low-income patients at greater levels than their nonparticipating colleagues. The authors recommend that the Government play a stronger role in encouraging development of collaborative programs through grants. A list of federally funded joint residency programs is provided. 9 pp., 64 refs., 2 figs., 6 tables.

Washington Consulting Group. *Survey of Certified Nurse Practitioners and Clinical Nurse Specialists: December 1992, Final Report.* Health Resources and Services Administration, Division of Nursing: Washington, DC, February 1994.

After providing background information, the report reviews results of the survey according to the following categories: overview, NP and CNS population by education, certified NP and CNS population by certification status, employment of certified nurses as NPs and CNSs, level of autonomy, NP prescriptive authority, NP prescribing practices, level of autonomy for prescribing practices, barriers to practice, and summary. Three appendices complement the discussion: A, tables; B, survey methodology; and C, survey instrument. 206 pp.

Weiner, J.P. Forecasting the Effects of Health Reform on US Physician Workforce Requirement: Evidence From HMO Staffing Patterns. *The Journal of the American Medical Association* 272(3):222-230, July 20, 1994.

This article provides an estimate of the effects of health reform on the U.S. physician workforce requirement. Its basic methodology is to extrapolate current patterns of staffing within managed care plans to the reshaped health care system of the year 2000. Based on a set of assumptions, the article forecasts that (1) there will be an overall surplus of 165,000 patient care physicians; (2) the requirement and supply of primary care physicians will be in relative balance; and (3) the supply of specialists will outstrip the requirement by more than 60 percent. 9 pp., 32 refs.

Weiner, J.P. The Demand for Physician Services in a Changing Health Care System: A Synthesis. *Medical Care Review* 50:4, Winter 1993.

This paper, commissioned by COGME, assesses the effects of health care system trends on the future demand for physician services overall and within six major specialties. It explores and, where possible, estimates the effect of changes that may occur in the organization, financing, and provision of health care over the next decade and provides a synthesis of the findings in the available health policy and research literature. 37 pp., 49 refs.

Weiner, J., Steinwach, D., and Williamson, J. Nurse Practitioner and Physician Assistant Practices in Three HMOs: Implications for Future U.S. Health Manpower Needs. *American Journal of Public Health* 76:507-511, 1986.

This article reviews an empirical study of the practices of nonphysician providers (NPPs) in three large health maintenance organizations (HMOs) including the physicians' and NPPs' views on the role of NPPs. The study then compares these roles with delegation patterns incorporated in the modeling methodology of Graduate Medical Education National Advisory Committee (GMENAC). Statistics show that, for at least one of the HMOs, the level of delegation to NPPs was even higher than the high levels considered ideal in the GMENAC model. The study concluded that concerns with acceptance and the role of NPPs have been replaced by considerations of cost, availability, and the increasing numbers of physicians competing for similar opportunities. 5 pp., 14 refs.

Weissart, C.S., Knott, J.H., and Stieber, B.E. Education and the Health Professions: Explaining the Policy Choices Among the States. *Journal of Health Politics, Policy and Law* 19(2):361-392, 1994.

This report examines what the authors contend is the critical role of states in reforming health professions education, an area highlighted as particularly deficient in nationwide discussions of the need for health care reform. The authors point out that the states are the primary funding source for health professions schools, the chief licensors and regulators of health professions, regulators of private health insurance, key providers of Medicaid, and architects of a variety of subsidy and regulatory programs to provide incentives for health professions to choose specialties and locations for practice. In their report, the authors include a taxonomy of state policies affecting health professions education reform. The authors group policy options for the states into four types: regulation of health care professions; reimbursement policies affecting public and private insurers; programs targeted to rural and underserved areas; and policies targeted to support health professional schools. This taxonomy classifies the states according to the choices they have made. The authors conclude that few states take advantage of these policy options across the full spectrum, thereby ignoring potential means of encouraging more primary care providers in underserved areas. Results also highlight the political nature of these policy choices and the variable nature of state responses to this issue. 32 pp., 57 refs.

Appendix E:

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The National Advisory Council on
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