Medical Education and Research Costs (MERC)

A final report to the Legislature

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Minnesota Department of Health
Health Economics Program

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Executive Summary

The Minnesota Legislature recognizes the importance of medical education and research to the state and its economy. As part of the 1993 and 1994 MinnesotaCare Acts, legislators asked the Commissioner of Health to study the costs and financing of medical education and research.[1]

The Commissioner established the Medical Education and Research Cost (MERC) Advisory Task Force, representing key stakeholders, to assist in the study. Two reports have already been submitted to the Legislature on the progress of the study.[2] This report contains the final conclusions and recommendations of the Commissioner of Health.

Since all health care stakeholders, as well as society at large, benefit from medical education and health care research, it is appropriate that the costs of these activities should be fairly allocated across the health care system. The impact of increased competition and the increasing unwillingness of purchasers to pay for the incremental costs of teaching and research through negotiated rates, as well as the anticipated cuts in Medicare funding for medical education, contribute to the problem of decreased funding for these activities.

Challenges to Medical Education and Research

Training clinicians and conducting health care research are costly activities. Teaching institutions[3] have typically financed a portion of the cost of these activities through patient care revenues. Patient care charges at accredited teaching institutions are generally higher than those at non-teaching and non-research institutions because they are intended to cover a portion of the institution's teaching and research costs. Public and private health care group purchasers[4] have traditionally paid this difference (termed the "education and research

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[1] In the context of this report, "medical education" refers only to the clinical training of physicians, dentists, advanced practice nurses, and physician assistants. "Health care research" includes only clinical, outcomes, and health services investigations.

[2] Minnesota Department of Health. *Medical Education and Research Costs (MERC) In Minnesota's Reformed Health Care System: An Interim Report from the Commissioner of Health to the Legislature.* Minnesota Department of Health, St. Paul, MN. 1993. **-AND-** Minnesota Department of Health. *Future Funding for Medical Education and Research in Minnesota: A Report to the Legislature and Recommendations for Continued Study.* Minnesota Department of Health, St. Paul, MN. 1994.

[3] This report will use the term "teaching institution" to refer to any hospital, medical center, clinic, or other organization that currently sponsors or conducts medical education (accredited programs) and/or clinical research in Minnesota.

[4] This report will use the term "group purchaser" to refer to a person or organization that purchases health care services on behalf of an identified group of persons, regardless of whether the cost of coverage or services is paid for by the purchaser or by the persons receiving coverage or services as further defined in rules adopted by the

increment"), thereby covering a portion of the cost of medical education and research. These costs were typically passed on to consumers in their premium rates at a time when there was less emphasis on cost. The implicit rationale was that teaching institutions were seen by purchasers (as well as by society in general) as state, regional, and perhaps even national resources. The higher charges they were willing to pay were equivalent to a tax, of sorts, to guarantee that these institutions would continue to be at the forefront of modern medicine as well as to educate health professionals for the future.

However, the group purchasers' willingness to voluntarily pay the education and research increment is eroding. In a price competitive market, group purchasers of medical services are increasingly unwilling to pay the higher charges at teaching institutions when they can obtain care of the same quality for less cost at another institution. In Minnesota, as in many other areas of the country, group purchasers can obtain most patient care services at non-teaching institutions. In such a competitive environment, therefore, teaching institutions may no longer be able to include the education and research increment in their charges and expect purchasers to pay for the additional costs.

Economic Impact of Medical Education and Research Activities in Minnesota

Although it is becoming more difficult to fund these activities, medical education and research are essential: as already noted, the long-term success of any health care system depends on the renewal of its work force and continued investment in health care research. The education and research products of teaching institutions are "our investment in the future" (Kassirer 1994). This is evident in Minnesota, which is recognized as a world leader in training health care professionals, conducting innovative research, and providing high quality care. The state's vibrant health care environment has led to numerous innovations and medical breakthroughs (MDTED 1993).

Health care is the state's leading industry, employing at least 190,000 Minnesotans and generating at least $15 billion of the annual gross state product. The state's medical education and research infrastructure significantly influences Minnesota's health care system and overall economy. New jobs and tax revenues, for example, accrue to the state as a result of the significant external research funding received by Minnesota organizations involved in research. Longer-term benefits include the numerous large and small health-related businesses, including such well-known industry leaders as Medtronic, that have been started in Minnesota on the basis of research done at organizations within the state (MDTED 1993).

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commissioner [of health]. "Group purchaser" includes, but is not limited to, health insurance companies, health maintenance organizations and other health plan companies; employee health plans offered by self-insured employers; group health coverage offered by fraternal organizations, professional associations, or other organizations; state and federal health care programs; state and local public employee health plans; workers' compensation plans; and the medical component of automobile insurance coverage. (Minnesota Statues, Chapter 62J.03, Subd. 6)

Minnesota's medical device manufacturing industry is an excellent example of the statewide impact of medical education and research on the state's overall economy. Minnesota is second only to Utah in its share of the medical device manufacturing industry in the national economy. Total production equalled $1.3 billion in 1990, and this field is considered a "basic industry [in Minnesota], generating income and jobs for the state through high value-added exports." In turn, this and other high-technology industries in the state "create demand for components and other intermediate products, thus generating more jobs." In 1990, there were 176 medical device manufacturing establishments with approximately 14,450 employees. This accounted for 4.1 percent of all manufacturing employment for 1990 (MDTED 1993). This is just one of the ways in which the activities of medical education and research influence the state's economy and illustrates the need for the continued support of these activities. Thus, as traditional group purchasers withdraw support of the education and research increment, alternative funding must be found.

Guiding Principles

The following guiding principles were the basis for discussion and evaluation of the proposed recommendations (MDH 1994). They are organized into five key areas: 1) Global principles; 2) Financing; 3) Administration; 4) Education-specific; and 5) Research-specific.

Global

- Minnesota should remain a national and international leader in training future generations of health care professionals and in advancing health care knowledge.
- Public policies for medical education and research should help expand access, contain costs, and assure quality.
- In return for public funding, training programs should be responsive to public policy goals on medical education and research.
- Research and patient care are integral to the education of health care professionals.

Financing

- The costs of medical education and research should be identified.
- All health care purchasers, including public, private (including self-insured), and individual purchasers should help finance medical education and research.
- Since all Minnesota residents potentially benefit from medical education and research activities, the public should help finance these activities through the state's general revenues or other broad-based funding mechanisms.
- Funding for medical education and research should:
  - replace a portion of patient-care dollars lost or at risk in a competitive market;
  - be predictable, stable, and sufficient to achieve desired policy objectives; and
  - allow payments to existing and new education and research programs.
- Funding for medical education should flow to the entity that incurs the costs.

Administration

- Implementation and administration of any alternative financing mechanism should be simple and inexpensive.

Education

- Minnesota's teaching institutions should be responsive to the evolving health care professional workforce requirements by:
  - producing an appropriate supply of physicians, dentists, advanced practice nurses, and physician assistants, at a minimum, to meet the needs of the state;
  - producing an appropriate specialty mix (generalists vs. specialists) to meet the needs of the state; and
  - providing health professionals the necessary knowledge, skills, and competencies for tomorrow's health care system.
- Public policy incentives should be developed to:
  - promote the training of an appropriate mix of health professionals in order to meet health reform's access, cost, and quality goals;
  - resolve any maldistribution of physicians, dentists, advanced practice nurses, and physician assistants in Minnesota; and
  - influence the gender mix and cultural diversity of matriculants.
- The state should only set broad policy goals to modify the health professional workforce, leaving the development and management of implementation strategies to the medical education infrastructure.
- Quality control of education programs should continue to be assured by the teaching institutions themselves, according to the standards of national, private accreditation and regulatory organizations.
- Performance and competencies of physicians, dentists, advanced practice nurses, and physician assistants should remain under the jurisdiction of state licensure boards.

Research

- State funding and policy mandates for research that are currently funded by patient out-of-pocket expenses or a third party payer should:
  - promote research activities responsive to population health needs;
  - promote continued high quality research.

Recommendations

The following recommendations are based on the work of the Structural Options and Financing Options Subcommittees and three years of research and debate on the issues of funding for medical education and research activities.

- **Establishment of Medical Education and Research Trust Fund**

The Commissioner of Health shall request that the Legislature create and fund a Medical Education and Research Trust Fund with separate accounts for education and research. These funds would be distributed by the Commissioner to eligible programs. The distribution of funds will be accomplished through the application of a formula to the amount of funds

available for distribution. Some of the guiding principles for the development of this formula for education are:

- it is to be equitable (i.e, small programs as well as the major teaching institutions will be included and the funding divided fairly);
- it should provide incentives for areas of training that are deemed appropriate;
- it should not encourage the expansion of any area of training where there is an anticipated "oversupply" of providers.

Market forces are having a significant impact on the supply of providers, particularly influencing the mix of trainees. Further, while the total number of trainees are determined by individual decisions of the training facilities, market forces are influencing these decisions as well. The principles contained in the distribution formula are, therefore, designed to reward those training facilities most closely following the market lead in determining both the number and type of trainees to educate. Application for funding from the Medical Education and Research Trust Fund will be on a strictly voluntary basis.

• **Creation of the Medical Education and Research Cost (MERC) Advisory Commission**

The Commissioner of Health shall appoint an advisory commission. The advisory commission will assist in the development and implementation of a mechanism by which to administer the Trust Fund to be set up for funding the activities of medical education and research. They will also continue to study the costs and benefits of medical education and research, funding options, and associated workforce issues. The commission would consist of appointed members and be staffed by staff of the Health Department (similar to the structure of the current MERC Advisory Task Force). The Commissioner shall consider the interests of all stakeholders when selecting commission members. Members should include representation of public and private academic health centers, teaching hospitals, other accredited training programs, managed care organizations, health care group purchasers, other providers, and community leaders. Commission members shall represent both urban and rural interests, and include both ambulatory and inpatient care perspectives.

• **Establishment of Financing Mechanism**

The Department is requesting an annual appropriation of $10 million for the Trust Fund with first year funding to come from general revenues for FY 1997.

The $10 million estimate is based on preliminary and ongoing work by the MERC Advisory Task Force to identify the costs and revenues associated with teaching and research programs to determine the amount "at risk" in an increasingly competitive health care environment. Staff of the Health Economics Program's initial and preliminary estimate of the amount at risk, based on the current mix of teaching programs, is approximately $37 million. The Task Force recommended that public funds be used to fund only a *portion* of this deficit and recommended funding at 25 percent, representing an estimate of $10 million per year. The

cost/revenue calculations will continue to be refined as new and better information becomes available. *This estimate does not include a projection of anticipated cuts in federal Medicare funding for medical education.*

The MERC Advisory Task Force did not recommend a specific source of funding. However, they did indicate that the most desirable option for *new* base funding is an allocation from the general fund. This is indeed the most broad-based tax available in which virtually everyone benefitting is contributing toward the cost. In addition, the Task Force recommended that the self-insured contribute to the Trust Fund and encourages the Department of Employee Relations to contribute their "fair share" for the state's self-insured business to the Trust Fund as a model to all other self-insured plans in this state. This may be set up as a "contribution in lieu of tax." A certain amount paid per employee has been suggested.

• **Transfer of Existing Medical Education Funds to the Medical Education Trust Fund Account**

In addition to the base funding of $10 million, other sources may be considered for the Trust Fund. For example, the Department of Human Services (DHS) currently includes an "add-on" to the capitation rates for their Pre-paid Medical Assistance Program (PMAP) for medical education costs. If federal funds are block granted to the state, there may be opportunities for the medical education funds to be allocated through a different mechanism. The new Medical Education Trust Fund Account may be one alternative. By allocating Medical Assistance education funds through the Trust Fund, it is anticipated that there would be fewer administrative costs as well as potential better targeting of scarce resources. Should other such funding sources of medical education be identified in the future, they could also be consolidated into the Medical Education Trust Fund Account if it is deemed appropriate by the legislature.

• **Development and Implementation of Reporting Requirements**

Develop and implement a standard reporting format for the collection of medical education and research costs from all entities receiving funding from the Medical Education and Research Trust Fund. Reports will be submitted to the Commissioner of Health. *(NOTE: The Department of Health already has authority under Minnesota Statute 62J to collect certain revenue and expenditure data and has, since 1993, been collecting data on provider expenses and revenues for medical education and research. Any new initiatives should be coordinated with ongoing data collection activities.)*

• **Adjunct Recommendation — Increase Funding for Population-Based Research**

The MERC Advisory Task Force supports an increase in funding, separate from the Trust Fund, for Minnesota-specific, population-based research. This special allocation to the Minnesota Department of Health (MDH) should come from the general fund and should not supplant existing allocations, but should result in a net increase in total funds available for

this key aspect of health care research. The research may be conducted by MDH or contracted out to other appropriate entities.

• **Continue Work on Health Care Research**

The Commissioner of Health will, with the advice of the Medical Education and Research Cost Advisory Commission, continue the work of developing strategies to identify the cost of health care research that is funded by patient care dollars and mechanisms to increase funding for those activities.

• **Continued Refinement of Standard Care Requirement**

The MERC Advisory Commission should continue to work on a policy that would maintain dollars available for clinical research[5] in Minnesota by requiring all group purchasers operating in the state to cover *standard* care for those patients involved in clinical trials in Minnesota. This includes research involving investigational procedures and technology and Minnesota-specific outcome medical research conducted by group purchasers and providers to optimize cost-effective care. It excludes research sponsored by a federal agency or other entity. Plans would be required to cover the costs of care that would be provided if the patient were NOT involved in a clinical trial. This policy must be carefully designed so that health plans would not be required to cover additional costs over and above those costs which would have normally incurred through the standard course of treatment. In other words, standard care costs in clinical trials must not exceed the costs associated with standard treatment. *Note: Much work on definitions is still needed before such a policy could be implemented. Not all Task Force members agreed with this recommendation.*

• **Establish Voluntary Pooled Research Initiative**

Require the Commissioner to establish a mechanism through which group purchasers, in a cooperative voluntary effort with the research community, will select and fund a limited number of randomized, prospective studies. The purpose of the studies is to determine the effectiveness (both in terms of cost and patient outcomes) of certain diagnostic and therapeutic modalities. These studies will be selected by a committee of representatives of researchers, providers, and group purchasers. Selection of a project by this committee will result in a voluntary payment of all costs (as defined in the study proposal) incurred for the selected studies by the group purchasers operating in Minnesota. The number of studies may be limited as necessary, based upon the determination of the committee, taking into account the cost of studies already approved.

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[5] In the context of this report, "clinical research" refers to research conducted with human subjects (or on material of human origins such as tissues, specimens, or cognitive phenomena) with whom the investigator directly interacts in either an outpatient or inpatient setting. This includes the development of new technologies; mechanisms of human disease; therapeutic interventions; and clinical trials (NIH 1990).

I. INTRODUCTION

The purpose of this study on the costs and financing of medical education and research is to develop policy recommendations in accordance with the stated purpose in the 1994 MinnesotaCare Act:

> *"The legislature finds that health care research and the preparation of future health care practitioners are of great importance to the quality of health care available to the citizens of this state; that medical education and research must be designed to meet the health needs of the population and the changing needs of the health care delivery system; and that the cost of medical education and research should not place institutions engaged in these activities at a competitive disadvantage in the marketplace."*

Background research has been accomplished in the previous three years by the Department of Health with the advice of the Medical Education and Research Cost (MERC) Advisory Task Force. The legislative history, relevant definitions and guiding principles developed in the course of this previous work are included in this section as background information. Throughout this report, portions of text from the previous two reports will be included as necessary.

MERC Legislative History and Summary of Study Progress

The Minnesota legislature included a section in the 1993 MinnesotaCare Act directing the Commissioner of Health (Commissioner) to examine medical education and research costs. In 1993, the Commissioner was specifically requested to: (1) identify the annual cost of medical education and research; (2) establish a percentage of the annual growth rate in the state's total health care expenditures to be allocated for the cost of medical education and research; (3) develop a method to pool these funds into an "education and research fund"; and (4) distribute the fund to specific health care providers. The proposed medical education and research fund was seen as a mechanism to more fairly allocate the costs of medical education and research across the health care system (See Appendix A for 1993, 1994, and 1995 legislation).

In March, 1994, a preliminary report, *Future Funding for Medical Education and Research in Minnesota: A Report to the Legislature and Recommendations for Continued Study*, was submitted to the Legislature that provided a conceptual framework of the issues that needed to be considered in developing appropriate policies for the future funding of medical education and health care research. Citing the complexity of these issues, the Advisory Task Force requested additional time before recommending specific policies.

In 1994, the Legislature agreed to this plan and authorized the Commissioner to continue the MERC study. The 1994 MERC legislation included some additional responsibilities and

requirements of the Commissioner, and authorized the establishment of a new Advisory Task Force with expanded representation of stakeholders.

The Commissioner created the MERC II Advisory Task Force (Task Force) in August, 1994. On the 20-member Task Force were representatives from the major stakeholders interested in medical education and research (See Appendix C). The Task Force, which met monthly from August 1994 through January 1996 (with additional subcommittee meetings), provided valuable expertise, information, and direction to the MERC study. Since the complexity of the issues, combined with the difficulty in collecting necessary data, did not permit the Commissioner to complete all legislatively-mandated tasks by the 1995 deadline, an interim report was submitted, *Medical Education and Research Costs (MERC) In Minnesota's Reformed Health Care System: An Interim Report from the Commissioner of Health to the Legislature*. The study was extended an additional year. During the 1995 study period, two subcommittees were formed: Structural Options and Financing Options. These subcommittees reviewed the findings and literature to date and completed reports to the Task Force on the various facets of the study for which they were to make recommendations. Those recommendations were presented to the full Task Force and modified as necessary based on the comments and requests of the Task Force. Those reports form the basis for this final report.

The three MERC reports present both national and Minnesota perspectives. The national perspective is discussed when comparable Minnesota information is not available (e.g., cost of medical education in ambulatory settings); other times the national perspective serves to highlight similarities and differences between Minnesota and the nation. It is important to note that the education and research environment in Minnesota is unique and that national data may not be fully reflective of Minnesota's experience.

Definitions

Operative definitions of the two central terms, "medical education" and "health care research," are critical for the MERC study's purpose of calculating costs and developing appropriate financing policies. The MERC Advisory Task Force recommended narrow definitions of these common terms reflecting both feasibility (e.g., the targeted education and research activities must be able to be isolated and their costs measured) and administrative simplicity.

Medical Education

Medical education could include the entire range of activities to educate all health care practitioners (physicians, dentists, nurses, pharmacists, chiropractors, podiatrists, etc.) throughout their careers—from undergraduate through graduate and continuing education. The MERC Advisory Task Force considered: 1) the professions with the greatest impact on the health care system and the population's health; 2) the professions characterized by the greatest imbalance between supply and demand; 3) the education funds at greatest risk in Minnesota's reformed system; and 4) the professions for which data is most readily available or easily obtained. Based on these criteria, *"medical education" (in the context of this report)*

refers only to the clinical training of physicians, dentists, advanced practice nurses, and physician assistants.[6]

Clinical training refers to the patient-care component of health professional education, including clinical rotations and clerkships for medical, dental, advanced practice nursing, and physician assistant students (which are now spread throughout the education period) as well as residency training for physicians and dentists (referred to as Graduate Medical Education and Graduate Dental Education). Clinical training, as opposed to basic science didactic (i.e., classroom and laboratory) instruction, is primarily funded through patient-care revenues—which are at greatest risk in a competitive health care system. Restricting the definition of medical education to include only clinical training is not meant to ignore the cost of basic science didactic education; rather, it underscores the commonly accepted distinction that the cost of clinical training is a health care expense while the cost of basic science training is strictly an educational expense for the training site.

Health Care Research

Health care research could include all activities on the research continuum extending from basic research to health services research. A report from the Medical Alley association (Committee on Research 1994) identifies five types of research along that continuum:

> "Basic research encompasses development of the fundamental knowledge of behavioral and biologic systems. This type of research does not necessarily have specific diagnostic or therapeutic objectives.
>
> Clinical research involves studies of human diseases and how body systems are affected by the disease process.
>
> Applied research studies and evaluates diagnostic and therapeutic modalities involving humans and animals in clinical and laboratory trials. Patient-based research may involve normal or diseased populations.
>
> Product development research [includes] the evaluation and validation of a pharmaceutical product or medical device.
>
> Health services research defines and evaluates the methods and economics of health care delivery, patients' and providers' interactions and outcomes research."

In addition, many identify outcomes research, which examines the effect of health care interventions on patients' clinical conditions, as a distinct new field "positioned at the intersection of biomedical and traditional health services research" (AAMC 1993b).

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[6] Advanced practice nurses include Clinical Nurse Specialists, Certified Registered Nurse Anesthetists, Nurse Practitioners, and Certified Nurse Midwives.

Given the concerns identified above, for the purpose of the MERC study, *"health care research" includes only clinical, outcomes, and health services investigations.* Other types of inquiry that only indirectly affect patient care, such as market research or organizations' internal evaluations of practice patterns or resource utilization, are excluded. Such investigations are primarily designed to benefit specific organizations—their value to clinical science is minimal. Note that the 1993 MERC legislation further restricts the term "health care research" to investigations that are "funded by patient out-of-pocket expenses or a third party payer."[7]

Organization of Report

The next section (Section II) provides an overview of the medical education and research environment in Minnesota. Section III presents the findings of the Structural Options Subcommittee. Section IV presents the findings of the Financing Options Subcommittee. Section V summarizes and discusses the recommendations of the Commissioner of Health to the Legislature. The final section provides additional background information on financing medical education and health care research as well as a discussion of workforce issues.

[7] Furthermore, the 1993 MERC legislation only includes research "approved by an institutional review board [IRB] certified by the United States Department of Health and Human Services" (DHHS). Minn. Stat. Sec. 62J.045 Subd. 2 (1993). In the preliminary MERC report, the Commissioner recommended that the statute's IRB-approval clause be clarified. Research approved by an IRB with the appropriate "assurances" from the DHHS or other Federal department or agency should qualify as "health care research" for the purpose of the MERC study (MDH 1994).

II. Overview of Medical Education and Research Issues

This section summarizes some of the basic issues and discussions related to the activities of medical education and research. The significance of the activities of medical education and research to the state of Minnesota is discussed, as well as federal/state issues.

Challenges to Medical Education and Research

Training clinicians and conducting health care research are costly activities. Teaching institutions[8] have typically financed a portion of the cost of these activities through patient care revenues. Patient care charges at accredited teaching institutions are generally higher than those at non-teaching and non-research institutions because they are intended to cover a portion of the institution's teaching and research costs. Public and private health care group purchasers[9] have traditionally paid this difference (termed the "education and research increment"), thereby covering a portion of the cost of medical education and research. These costs were typically passed on to consumers in their premium rates at a time when there was less emphasis on cost. The implicit rationale was that teaching institutions were seen by purchasers (as well as by society in general) as state, regional, and perhaps even national resources. The higher charges they were willing to pay were equivalent to a tax, of sorts, to guarantee that these institutions would continue to be at the forefront of modern medicine as well as to educate health professionals for the future.

However, the group purchasers' willingness to voluntarily pay the education and research increment is eroding. In a price competitive market, group purchasers of medical services are increasingly unwilling to pay the higher charges at teaching institutions when they can obtain care of the same quality for less cost at another institution. In Minnesota, as in many other areas of the country, group purchasers can obtain most patient care services at non-teaching institutions. In such a competitive environment, therefore, teaching institutions may no longer

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Medical education activities in Minnesota are concentrated primarily in programs sponsored by or affiliated with one of the state's two academic health centers (AHCs), the Mayo Medical Center (Mayo) and the University of Minnesota Academic Health Center (U of M). Mayo and the U of M are among the largest AHCs in the country and are world-renowned for their education, research, and patient care. Both operate hospitals that are among the nation's premier research and teaching institutions.

The influence of Minnesota's two AHC extends far beyond the boundaries of Minnesota. Both are referral centers, attracting many out-of-state patients. Over 45 percent of the

325,000 registered patients at Mayo's Rochester facilities, for example, are now from outside Minnesota; the University of Minnesota derives nearly 20 percent of its revenue from out-of-state patients (Gold 1994). The market for graduates of the health professional training programs at Mayo and the U of M is nationwide, and for Mayo residents it is often worldwide.

Significance of Medical Education and Research

The health professional workforce is a cornerstone of every health care system. The training of tomorrow's clinicians[10], particularly of physicians, significantly affects the overall quality and availability of health care as well as the cost of care. Their training, how they practice medicine, and the supply and distribution of physicians in the health care system thus dramatically impact costs. An oversupply of physicians may increase costs. Costs may also increase when physicians provide care that could be appropriately provided by non-physician practitioners. Conversely, an insufficient number of physicians or other clinicians means some people will not have a regular source of care, resulting in missed opportunities for prevention. Geographic maldistribution, as well as an undersupply of any type of clinician, exacerbates this problem in rural and inner-city communities.

Health care research is the second cornerstone of every health care system. Biomedical breakthroughs over the past few decades have produced a staggering array of practical applications and useful technologies. Similar to medical education, research affects the delivery of both appropriate and quality care and, ultimately, the true cost of health care.

Health care research can significantly reduce both short term and longer term costs through the development of more cost-effective treatments, earlier detection and even annihilation of diseases. Yet, innovations are expensive and may result in increased costs. This occurs when the savings incurred from innovative surgical techniques are offset by the increase in patients having surgery (Culliton 1993). However, research has vastly improved the quality of our lives and contributed significantly to the health of the population. Much of health services research is specifically designed to measure and improve the quality of care. Finally, when research increases efficiency, it indirectly expands access by enabling the health care system to use the same quantity of resources to serve more people or provide more services.

Federal-State Issues

In an effort to cut costs, many areas under federal jurisdiction are currently under consideration as to whether they are appropriate for transfer to state authority. Programs that will remain under federal jurisdiction, such as Medicare (which is the single largest source of medical education funding), are trying to cut costs. It is expected, even in the near future, that cuts will be made to the funding available. Thus, the challenge to address the concerns raised by medical education and research rests with the states.

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[10] The term "clinicians" will be used in this report to refer to physicians, dentists, advanced practice nurses, and physician assistants.

Limits on State's Influence

Even though national reform efforts are more concerned with cost-cutting than preserving medical education and research funding, the state's role will remain restricted. The federal government will likely remain the largest single funding source for both medical education and health care research. This will continue to limit the state's leverage to influence these activities. Thus, state policies will continue to remain secondary to federal policies in their ability to influence these activities. Additional factors limiting a state's ability to significantly impact medical education and research within its own borders include:

- The state's permeable borders. For example, some clinicians enroll in health education programs in one state, receive post graduate training in another, and establish practice in a third. The significant in- and out-migration of health professional trainees and practitioners complicates efforts to control the number and mix of such professionals within a state.

- The lengthy training period. The long training pipeline (which can exceed 10 years—post-baccalaureate degree—for some physician specialists) means that any policies implemented now will not affect the supply of clinicians for many years. To a large extent, the health professional workforce supply, particularly for physicians, is determined for the next 10 to 15 years, regardless of any immediate changes in the number of clinicians trained or admitted to practice.

- ERISA. The federal Employee Retirement Income Security Act (ERISA) will continue to hamper the ability of states to apply health reform requirements to self-insured employers. ERISA may, for instance, restrict a state's ability to require *all* health care purchasers to help pay for medical education and research activities, even though such activities benefit all residents of that state.

Overall, Minnesota's policies on medical education and research should take account of and respond to the state's unique characteristics, recognize the national impact of its education and research activities, and acknowledge its limited ability to affect medical education and research; yet these policies should provide clear direction, with flexibility to enable the state to adapt successfully to whatever policies or reforms that may ultimately be enacted at the national level.

Congressional Medicare Proposal

In November, 1995, Congress passed HR 2491, the Balanced Budget Act of 1995 (BBA), which would make changes to entitlement programs, decrease taxes, eliminate certain federal government programs, and reduce federal discretionary spending in order to balance the federal budget by the year 2002. The largest amount of savings in this legislation is derived from the Medicare program. The actual dollar amounts involved in this legislation are still under negotiation.

The current Medicare program recognizes the costs of graduate medical eduation in teaching hospitals and the higher costs of providing services in those institutions. Medicare has two payment mechanisms to those teaching institutions: direct graduate medical education (GME) payments and an indirect medical education adjustment (IMEA).

The BBA would create a new trust fund in the Treasury known as the Teaching Hospital and Graduate Medical Education Trust Fund, which would make annual payment distributions to teaching hospitals nationwide. The Trust Fund would include five accounts: the General MedicarePlus Incentive Account; the General Indirect-Costs Medical Education Account; the General Direct-Costs Medical Education Account; the Medicare Indirect-Costs Medical Education Account; and the Medicare Direct-Costs Medical Education Account. It is unclear what the timing or final outcomes of these reforms will be. The Minnesota Department of Health will, however, continue to closely follow reform intitiatives at the federal level.

III. Structural Options Subcommittee Report

The MERC Structural Options Subcommittee was formed to address some of the specific structural issues and questions relating to alternative funding mechanisms for the funding of medical education and research activities. The subcommittee was charged with addressing the following questions:

- Is there a need for state intervention in the funding of medical education and research?
- What specific role should the state play in collecting and distributing medical and research funds?
- Who should determine how the funds are distributed? (state agency, newly established commission, existing entity?)
- Who should receive the funds? (teaching institutions[11], health profession schools, consortia of schools and hospitals, residency sites, other?)
- What criteria should be established to determine who receives the funds? (financial, administrative, policy goals?)
- How should the funds be allocated? (based on the cost of the training program, per trainee, for primary care resident only?)
- What type of accountability should be built into the system to promote the education institution's accountability to their consumers?

The following section will provide a discussion of each issue and recommendation.

Is there a need for state intervention in the funding of medical education and research? If so, what specific role should the state play in collecting and distributing medical education and research funds?

Overall dollars coming into teaching institutions for medical education and research are decreasing. However, it is not the role of the state to *fully* fund medical education and research costs, although funding a portion of those costs remains a necessity for the

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[11] This report will use the term "teaching institution" to refer to any hospital, medical center, clinic, or other organization that currently sponsors or conducts medical education (accredited programs) and/or clinical research in Minnesota.

continuance of such activities. As stated in the 1993 MinnesotaCare legislation authorizing the MERC study, "the legislature finds that all health care stakeholders, as well as society at large, benefit from medical education and health care research. The legislature further finds that the cost of medical education and research should not be borne by a few hospitals or medical centers but should be fairly allocated across the health care system." (1993 Minnesota Statutes, Section 62J.045).

Continued reduction of funding is likely to result in insufficient resources to support continued clinical research and quality clinical educational experiences for students and residents, and will thus endanger the status of the state of Minnesota as a leader in both health care research and education. The role of the state is to continue to assist in funding such activities in order to maintain the level of quality for which Minnesota is so well known.

It is important that teaching programs operate as effectively and efficiently as possible, thereby improving their standing in the competitive market. Teaching institutions were able, in the past, to partially fund medical education and research expenses out of their operating budget through cost shifting from patient care revenues because payers were willing to support these costs. However, with the current climate of increasing competition, payers are no longer willing to pay for the costs that are inherent in institutions with teaching and research programs. Declining patient revenues, and how to mediate those effects, are a key consideration in addressing the financial needs of these programs. Medical education and research are often tied together due to the fact that faculty and institutions are often involved in both teaching and research. It is difficult to separate funding for one function without impacting the other. Further complicating the financial condition of these teaching programs is the fact that federal funding is decreasing, and state monies cannot be expected to fill the full gap.

The portion of funding that is of concern in this report is the amount of money lost due to reduced patient care revenues. Therefore, that amount must be estimated, collected, and redistributed to those programs experiencing such loss, whether in an inpatient or ambulatory setting.

Clinical research, and in particular, Minnesota-specific population-based research, are key areas in which even current levels of funding are insufficient to meet the need. As resources decline in this area, the gap in funding will grow even larger. In this area of research there is a need not only for maintaining the current level of funding, but actually to *increase* available funding. The most efficient way to respond to this particular need is to allocate a specific *additional* amount (apart from the funds set aside to replace lost patient care revenues) to the Minnesota Department of Health (MDH) for such projects. In addition to Department-generated priorities for research, externally-generated ideas for research projects could be selected via a review and approval process. Thus, MDH could do these projects or could contract them out to appropriate entities.

A major concern expressed by those programs engaged in clinical trials (defined as "randomized, prospective studies" for purposes of this report) involving investigational procedures and technology is that some payers are beginning to decline payment not only for the investigational portion of the trial, but also for that portion of patient care that would normally be reimbursed if the patient were not in the trial population. These clinical trials are critical in the development of new diagnostic and therapeutic modalities. While payment for the actual investigational procedures and technology is not recommended by the MERC Advisory Task Force, requiring all payers operating in this state to pay the cost of *standard* care for those patients involved in clinical trials in Minnesota *is* recommended. This includes research involving investigational procedures and technology and Minnesota-specific outcome medical research needed by payers and providers to optimize cost-effective care. It excludes research sponsored by a federal agency or other entity. In other words, that portion of unfunded care that would be paid for if the patient were NOT involved in a clinical trial must still be covered.

It is also important to note that health plans, insurer networks and employers have a stake in the teaching programs to assure the availability of a continuing workforce—one which is both appropriately and adequately trained to meet current and near-future physician, nursing, and non-physician provider needs.

Who should receive the funds?

Teaching institutions or a consortia should, for reasons of administrative efficiency, receive any additional funds. Further, as these entities receive the funds, accountability must be built into the process to assure that funds are used as intended and directed to the designated programs or areas. *(NOTE: "Teaching institution," in the context of this report, is defined as "an entity that sponsors a training program" and is not limited to major teaching hospitals.)*

The alternative to distributing funding through a teaching institution is to distribute through a consortium. "GME consortia" is defined as "formal associations of medical schools, teaching hospitals, and other organizations involved in the residency training of physicians, with central support, direction, and coordination allowing members to function collectively" (Kelly, et al. 1994). The proponents of consortia "have four major expectations for GME consortia:

- improve the organizational structure and governance of residency training programs through increased coordination among local or regional organizations directly and indirectly involved in training residents;

- increase residents' ambulatory care training experiences through the participation of existing and potential ambulatory care training sites and organizations;

- implement community-wide programs to achieve specific physician training goals related to physician distribution by specialty and location; and

- have sufficient power and authority to accomplish the objectives listed above. Many proponents would have consortia allocate resources to help achieve these goals."

The consortia model is seen as a viable option for increasing accountability to society's needs. It is also recognized that any given consortium will vary tremendously from others. Factors such as location, type of membership, size, governance and authority, and training goals are key in determining the role and impact of a given consortium.

In Minnesota, one example of an existing consortium is the Duluth Graduate Medical Education Council, Inc. This group, composed of representatives of St. Luke's Hospital, St. Mary's Medical Center, Miller-Dwan Hospital and University of Minnesota--Duluth (UMD) School of Medicine, has been an incorporated entity since the 1970's and serves as the governing organization of the Duluth Family Practice Residency.

At the present time, Medicare funding for medical education is limited to teaching hospitals and the hospitals in turn support the residency. Similarly, state dollars for the residency flow through the UMD School of Medicine to the residency. The major benefit of this consortia is that it promotes a broad community involvement in the residency program. The major problem lies with the present method of distribution of funds. The current distribution model results, at best, in multiple methods of accountability of funds going to support the training activities, and, at worst, can result in diversion of funds to other purposes. Still, the consortium is seen as a positive and important influence on the residency program.

Continuity of funding is critical. Teaching programs must know how much funding they can count on for the next few years. Thus, a "rolling plan" which will provide funding estimates for 3-5 years into the future is important. However, teaching institutions should have the option to NOT participate in any funding program if they so desire.

How should the funds be allocated? Who should determine how the funds are distributed?

In response to the considerations listed in the previous section, a model (see Appendix B) was developed for the distribution of medical education funds. (A model for the distribution of research funding has not yet been developed.) The model is a hybrid structure which includes both a formula and a commission. The Medical Education and Research Cost (MERC) Advisory Commission would consist of a panel of experts and stakeholders in the areas of medical education and research. The function of the Commission is to assist in the development and implementation of a mechanism by which to administer a Medical Education and Research Trust Fund for the activities of medical education and research. The Commission will also carry responsibility for revision of the formula as necessary on an ongoing basis based on funding availability, structural changes, market activity, federal legislative actions, workforce needs, and/or other intervening factors. A portion of the funding will be used to target, via incentives, specific programs or areas deemed as high priority. Thus, the formula would be based on an amount adjusted for any incentives. Due to the rapidly-changing marketplace, ever-changing workforce needs, and the volatility of

funding sources, it is believed that the formula will need review and refinements on a biennial basis in order to maintain an appropriate impact.

The Commissioner of Health shall appoint members to the MERC Advisory Commission. The Commission will assist in the development and implementation of a mechanism by which to administer the above-mentioned Trust Fund to be set up for funding the activities of medical education and research. They will also continue to study the costs and benefits of medical education and reseach, funding options, and associated workforce issues. The Commission will also establish a specific methodology and means of documenting fiscal responsibility for resources distributed through the Trust Fund.

The Commission would consist of the appointed members and be staffed by staff of the Health Department (similar to the structure of the current MERC Advisory Task Force). The Commissioner shall consider the interests of all stakeholders when selecting Commission members. Members should include representation of public and private academic health centers, teaching hospitals, other accredited training programs, managed care organizations, health care group purchasers, other providers, and community leaders. Commission members shall represent both urban and rural interests, and include both ambulatory and inpatient care perspectives.

The diagram in Appendix B illustrates the flow of dollars by dashed lines and the reporting process by solid lines. The right side of the diagram shows how payers contribute via 1) payments made to the state that would be directed to the Trust Fund; 2) contributions made directly to the Commissioner of Health for the Trust Fund; and/or 3) direct contributions made to individual programs, teaching institutions or consortia.

Flow of Dollars

The Medical Education Trust Fund distribution model begins with the Minnesota Legislature allocating funds to the Medical Education and Research Trust Fund, in which one account is designated for medical education, and one for research. These funds would be distributed by the Department of Health based on a formula designed to provide an amount adjusted by incentives for targeted priorities. The funds would go directly to eligible teaching institutions/consortia and must be distributed to the intended programs and designated training sites.

Reporting Process

On an annual basis, the teaching institutions/consortia receiving Trust Fund grants will be required to report, based on internal reporting from the actual programs and training sites receiving the funding, to the MERC Commission on the use of the funding. The Commission will review the reports annually and determine that funds were appropriately allocated. The Commission will also, on a *biennial* basis, review the formula to determine if it does in fact reflect the changing needs for medical education. The Commission will then advise the Commissioner of Health of their recommended changes to the funding formula. The Commissioner of Health will be responsible and accountable for revision of the formula

following review of the recommendations of the MERC Advisory Commission. This will require a report to the Legislature detailing the specific changes requested and the basis for those changes so that the relevant rules or legislation may be amended.

As mentioned previously, the model utilizes both a Commission and a formula. Some of the guiding principles for the development of this formula include: 1) it is to be equitable (i.e, small programs as well as the major teaching institutions of Mayo and the University of Minnesota will be included and the funding divided fairly); 2) it should provide incentives for areas of training that are deemed appropriate; 3) it should not encourage the expansion of any area of training where there is an anticipated "oversupply" of providers.

The following draft formula provides one methodology for distributing a total statewide pool of medical education funds equitably across all: (1) eligible and participating health care institutions in the state and (2) the appropriate educational training programs within each teaching institution. The formula assumes that the total funds in the statewide pool (TD) is known.

$$TD = \sum_{i=1}^{nsi} \sum_{p=1}^{npi} CF\ (PIF_p\ (T_{ip} * RA/T_p\ )\ )$$

For which:
CF = a conversion factor (i.e., general across all teaching institutions/consortia and all programs) by which the results of the distribution formula are adjusted to arrive at the fixed statewide funding pool amount;

PIF_p = a program incentive factor by which program specific incentives can be created by adjusting program distributions;

T_{ip} = total number of trainees in each program and teaching institution/consortia;

RA/T_p = statewide (i.e., not teaching institution/consortia specific) relative allocation amount per trainee for educational program "p", where the programs referred to by "p" are those to which there is a need to distribute funds differentially;

and the subscripts:
nsi = number of teaching institutions/consortia across the state;
npi = number of educational programs in each teaching institution/consortia;
i = teaching institution/consortia; and
p = training program.

What criteria should be established to determine who receives the funds?
The new commission, as proposed above, would be responsible for fully defining the eligibility requirements. One major requirement is that the program be accredited (or in the

case of new programs, provisionally accredited). The process, however, must be flexible enough to allow for innovative new programs to be created and funded.

What type of accountability should be built into the system to promote the education institution's accountability to their consumers?

Accountability must be a part of any funding mechanism. It must be assured that funding received by a *teaching institution/consortia* is actually directed to the *program* for which it was intended. Teaching institutions may be required to file an annual report describing how funds are spent and other information deemed necessary by the MERC Advisory Commission. As mentioned above, it was felt that the specific methodology for reporting should be developed by the Commission. The methodology may be revised periodically as reporting systems change in response to federal initiatives, accounting practices, technological advances, etc.

Conclusions

It is appropriate and necessary for the state to intervene in the area of funding for medical education and research. Through the development and establishment of a commission, funding available for medical education and research can be most efficiently and equitably collected and distributed. The creation and ongoing revision of a formula for distribution by the commission will ensure that the funding is distributed in the most appropriate manner, while the development and implementation of reporting requirements will ensure the funds are used in a fiscally-responsible manner.

Minnesota-specific, population-based clinical research is a key area in which even current levels of funding are insufficient to meet the need. A special allocation from the Legislature is necessary to sustain this aspect of Minnesota research. This allocation may be utilized by the Minnesota Department of Health for research the Department deems necessary, or the Department may fund appropriate external entities.

Greater participation in funding for health care research by payers doing business in Minnesota is necessary for the continuance of this important function. The payment of "standard care" costs is essential in maintaining ongoing clinical trials in Minnesota involving investigational procedures and technology. Further, with payer participation in determining which studies are appropriate, the research community and the payers can partner to achieve greater cost-effectiveness as well as better patient outcomes.

IV. Financing Options Subcommittee Report

The Financing Options Subcommittee was formed to address some of the key issues relating to alternative financing mechanisms for the funding of medical education and research activities. The subcommittee was charged with the following questions:

- Who should pay for medical education and research costs?
- Should the self-insured plans be included in funding mechanisms and how?
- How should the funding be generated?
- What is the rationale and support for the financing mechanism chosen?
- How much should be collected?
- Should the funding for research and medical education come from the same source?

The following section will provide a discussion of each issue and recommendation.

Who should pay for medical education and research costs?

All citizens of the state of Minnesota have a definite stake in and benefit from these activities. These benefits include both improved medical care and an increased economic status as a result of the monies, jobs, and business brought into the state.

The uncovered costs of medical education and research should be borne by those who benefit from such activities. Thus, costs should be allocated to the centers that perform such activities, patients who benefit from medical care delivered in the state of Minnesota, and the citizens of the state of Minnesota.

Should the self-insured plans be included in funding mechanisms and how?

Approximately 1.4 million Minnesotans are enrolled in self-insured plans for a variety of reasons, with one reason being decreased costs to both employers and employees (MDH, Issue Brief No. 7, 1995). These plans do, however, benefit from medical education and research performed in the state just as the rest of the health care industry does. For that reason, it is both equitable and desirable to include these plans in any effort to collect funds for these activities. However, the current law under which these plans operate provide only limited options for their inclusion in any broad-based contribution plan.

There has, however, been an acknowledgement by representatives of the self-insured groups that they see the value of maintaining our world class education and research status in the state of Minnesota. It has been further acknowledged that at least some of the self-insured groups would be interested in contributing under a broad-based contribution plan.

How should the funding be generated? What is the rationale and support for the financing mechanism chosen?

During the initial meetings of the MERC Advisory Task Force, general guiding principles were developed to assist the group in making specific recommendations for the financing of medical education and research in the state of Minnesota. One of these guiding principles was that any potential funding source be broad-based, predictable and stable. The major source of funding to fit this principle is the current income tax. This tax is the most broad-based and equitable tax in the state of Minnesota. It is progressive, with revenues collections being proportional to income in each particular segment of the population (e.g. the group that represents 40 percent of the income in the state provides 40 percent of the income tax revenue). This would also represent the most stable and predictable source of revenue, and is thus the most desirable. Revenues accrued from the income tax are placed in the general fund and then allocated for expenditure.

Other less broad funding sources were also discussed. One source is the HMO and non-profit gross premiums tax. As of January 1, 1996, HMOs and non-profit organizations began paying a tax of *one* percent of gross premium revenues. Medical insurance companies are currently taxed at a rate of *two* percent of gross premium revenues. The argument has been made that the distinctions between HMOs and non-profits and the medical insurance companies have become sufficiently minor that a different tax rate is not justified. An increase in the tax rate to HMOs and non-profits (to match the two percent that assessed insurance companies currently pay) is therefore an option that not only creates a more level playing field in the industry but also would provide a substantial portion of the necessary funding for medical education and research. It is estimated that as much as $25 million per fiscal year could be raised through this mechanism. *Not all current MERC Advisory Task Force members concur with this source of funding. The concern was expressed that since more employers and fraternal groups are moving into the self-insured market, this source of funding is unstable. Further, it is not a broad-based source of funding.*

Another option considered was whether some of the money in the Health Care Access Fund could be diverted to medical education and research. Funds for the Health Care Access Fund are derived from hospital and other provider taxes, HMO gross premium taxes and non-profit premium taxes. Annual structural surpluses ranging from $71 to $77 million are projected for the Fund through FY 1999. The magnitude of the cumulative surplus is estimated to increase from $54 million at the end of FY 1995 to $357 million at the end of FY 1999, assuming eligibility standards for MinnesotaCare remain at current levels.[12] The major reasons for

[12] Estimate provided by Minnesota Department of Finance on February 1, 1996.

considering this option are that the funds are already being collected, there is a surplus in the Health Care Access Fund, and the funds come in part from the entities to which it would be returned.

In addition to the new base funding requested, other sources may be considered for the Medical Education and Research Trust Fund. For example, the Department of Human Services (DHS) includes an "add-on" to the capitation rates for their Pre-paid Medical Assistance Program (PMAP) for medical education costs. If federal funds are block granted to the state, there may be opportunities for the medical education funds to be allocated through a different mechanism. The new Medical Education Trust Fund account may be one alternative. By funneling them through the Trust Fund, it is anticipated that there would be fewer administrative costs as well as the potential for better targeting of scarce funds. Should other such funding sources of medical education be identified in the future, they could also be consolidated into the Trust Fund if it is deemed appropriate.

There are two basic options for participation of the self-insured in funding medical education and research. The first is a "voluntary contribution in lieu of tax," perhaps in the form of a specific amount contributed per employee, which would be directed to the Trust Fund. The contribution is voluntary, but expected, as a "fair share" of the funds necessary to support these activities. The second option is to merely open the fund for voluntary donations of any amount as desired.

How much should be collected?

General Principles

Historically, academic medical institutions have not had formal mechanisms for detailed accounting of medical education and research costs. Each department submitted a budget to the overseeing entity (hospital, university, or medical center) to cover costs not covered by patient revenues and to allocate administrative costs among different programs at the same institution (e.g., surgery and internal medicine programs may share secretarial services and each would pay a share of this cost). In the "fee for service" era, prices charged for services delivered could be adjusted to provide adequate funds for the research and education missions of academic institutions.

Competition for patients was based on patient preferences and perceptions of quality of care delivered. Many specialized services were delivered at academic institutions that could not be obtained elsewhere. In many cases, even patients who didn't require specialized care were hospitalized for the convenience of the patient and the care provider. Over the last fifteen years dramatic changes have occurred in the medical market. Well-trained specialists now practice outside of academic medical centers providing patients with more choices for specialty and subspecialty care. Price competition has become a major factor in the choice of medical plans, requiring providers to become as efficient as possible to provide competitive prices for services. Some of the mechanisms used to obtain price efficiencies are more

outpatient medical care, restricted access to specialty consultation, and reduction in overhead through staffing and equipment changes.

Many of these changes have been embraced by academic medical institutions. To the extent possible, many of Minnesota's academic institutions have made dramatic adjustments to remain competitive in the Minnesota medical market. However, because of the education and research missions of these institutions, their costs for the delivery of care within these institutions remains higher.

We have attempted to estimate the costs associated with medical education and research and to identify non-patient derived sources of funding currently available. (See "Estimated Costs of Medical Education: *Work in Progress*" on next page.) Direct identification of costs incurred in training has been difficult. Some of the reasons for this difficulty are:

1) Historically these costs have not been directly accounted by the individual institutions.

2) When costs are accounted, institutions have not used a uniform manner of accounting for these costs.

3) Some costs are indirect costs, that is, not monies paid out, but loss of income or efficiency from training or research (e.g. increased laboratory testing for educational or research reasons, care of more severely ill patients, services provided to a disproportionate share of uninsured or underinsured patients, etc.).

Due to these problems in the data, the figures presented must be considered a preliminary estimate rather than a definitive amount. However, these numbers do indicate the magnitude of the funds involved and will provide a basis for developing consensus on mechanisms to more accurately collect this type of information in the future.

Educational Costs

Direct Medical Education (DME) Costs for Physicians

In the legislation authorizing the formation of the MERC Advisory Task Force, the Legislature specifically requested the Commissioner of Health to "identify the annual cost of medical education and research" (Minnesota Statute §62J.045, Subd. 3). The MERC Advisory Task Force established a Cost of Education Subcommittee to develop estimates of direct and indirect medical education costs. On the subcommittee's recommendation, an ad hoc group of chief financial officers (CFOs) from Minnesota's teaching hospitals was convened to estimate direct medical education costs. Known as "the CFO Group," they used a uniform cost-estimate methodology developed by the actuarial consulting firm Deloitte and Touche to develop estimates for six of Minnesota's largest medical education institutions. The CFO Group provided estimates of educational costs by categories, including resident salaries and benefits, teaching physician salaries and benefits, administrative and clerical salaries and

Estimated Costs of Medical Education
— *Work in Progress* —

ESTIMATED COSTS FOR FY 1993	
Direct Graduate Medical Education Costs (Inpatient & Outpatient)	$172,320,000
Indirect Graduate Medical Education Costs (Inpatient & Outpatient)*	$45,000,000
Medical Student Clinical Training Costs	$25,105,000
Advanced Practice Nurse Training Costs	$2,731,000
Dentist Clinical Training Costs **	
Physician Assistant Clinical Training Costs	No Costs for 1993
ESTIMATED TOTAL COSTS	**$245,156,000**

ESTIMATED REVENUES FOR FY 1993	
Federal Revenues	
Direct Medical Education (DME)	$23,700,000
Indirect Medical Education Adjustment (IMEA)***	$88,410,000
Tuition	
Medical Students	$5,284,000
Advanced Practice Nurses	$693,000
State Funds for Medical Student/Resident Education	
U of M Primary Care Physician Training Initiative (Undergraduate)	$432,000
U of M Primary Care Physicians Initiative (Graduate)	$1,800,000
Mayo Medical School Students (MN Residents, Undergraduate)	$682,000
Mayo Graduate School of Medicine—Grants for Family Practice Residents	$274,000
U of M Hospital Education Offset	$10,800,000
U of M General Education Funds	$25,962,000
U of M Graduate Nursing Funds	$2,038,000
Rural Physician Associate Program	$889,000
Rural Physician Loan Repayment Program	$96,000
Loan Repayment Programs for Mid-level Rural Practitioners and Nurses	$41,000
Estimated Benefits from Trainees	$47,500,000
ESTIMATED TOTAL REVENUE	**$208,601,000**

ESTIMATED TOTAL DEFICIT (Costs - Revenue)	**Approx. $36,555,000**

* Based on a national model for estimating indirect costs of medical education

** Estimates for dental costs/revenues were not available at time of publication

*** Includes Medicare payments to compensate teaching hospitals for intangible factors such as their relatively higher inpatient operating costs, uncompensated care and the broader range of services and technologies offered. These costs cannot be directly translated to audited cost report data.

benefits, direct costs of supplies, space and equipment costs, and an allocation for overhead costs. From this data, staff from the Minnesota Department of Health (MDH), Health Economics Program, calculated a per resident education cost for each hospital. MDH staff then combined these per resident costs for each hospital using a weighted-average based on the total direct cost reported by each hospital. The weighted-average per resident cost was $91,505 in FY 1993. Finally, in order to determine the total direct cost of education for Minnesota's physicians, the per resident cost was multiplied by the number of full-time equivalent (FTE) residents (2,016) reported by the CFO Group. The resulting total, which is an aggregate estimate of total direct medical education costs for physicians, was approximately $184.5 million in FY 1993. That figure was adjusted to account for the fact that the VA Medical Center is entirely funded by federal funds. Thus the total DME costs for Minnesota are estimated at $172.3 million for FY 1993.

Indirect Medical Education (IME) Costs for Physicians (Inpatient and Outpatient)
IME costs refer to the incremental costs associated with clinical training. They include the costs associated with such things as the greater use of ancillary services because of the residents' inexperience; the tendency to try to make a more detailed diagnosis for educational purposes; the time delay due to oversight and consultation; the decreased productivity of nurses and other employees who have to assist the new residents; and increased record keeping requirements (Lave 1989). They may not directly be tied to costs associated with the increased casemix complexity and the wider range of services and technologies that generally accompany teaching (and research) activities. IME costs cannot currently be identified from organizational accounting systems and are thus extremely difficult to estimate. Therefore, to estimate IME costs, a national study of IME costs conducted by the health care consulting firm, Lewin-VHI, was used as the base for the Minnesota estimate. Lewin's national estimate of IME costs was then adjusted based on Minnesota-specific data. The resulting estimate was calculated to be $45,000,000.

Indirect Medical Education Medical Student Clinical Training Costs
There are three medical schools in Minnesota: University of Minnesota--Twin Cities campus, University of Minnesota--Duluth and the Mayo Medical School. None of these institutions directly accounts the cost of medical student clinical training which occurs predominantly within the last two years of medical school.

The combined annual enrollment of the three Minnesota medical schools is 275 students per each of the two classes in the clinical year (185 University of Minnesota--Twin Cities, 50 University of Minnesota--Duluth, 40 Mayo Medical School). Based on a 1993 study by Ginzberg, et al, the average annual medical education cost per student in 1990 was $38,000. Trended to 1993, the average annual cost per student is estimated to be $45,645, and results in an estimate of total costs of $25.1 million.

Advanced Practice Nurse Training Costs
Advanced practice nurses are a valuable part of the delivery of health care in Minnesota. The total student enrollment for all advanced practice nursing programs were approximately 172

students (86 students in each of two classes) in 1993. Fully allocated costs from the University of Minnesota to its School of Nursing for 1993 is estimated at $15,877 per student per year. While this amount, as well as tuition varies across the state, it is a middle-range amount that will be used to calculate the total costs for all of the programs. This $15,877 includes faculty and college staff salaries and benefits, supplies, equipment and other overhead, and when multiplied by the number of students results in an estimated total cost of $2.7 million for FY 1993. It is anticipated, however, that costs may rise in the future due to preceptor charges. (A "preceptor" is a clinical teacher who works with the university-based faculty of health professional programs to provide clinical learning opportunities and supervision for students.) Traditionally, a preceptor's primary source of income has been clinical practice with little or no actual or in-kind remuneration from the academic institution. There is concern, though, that as competition in the marketplace increases, these preceptors may begin charging a fee for their services in order to cover lost revenues.

Nurse Anesthesia and Nurse Midwife programs are included under "Advanced Practice Nurse" training. However, cost estimates were not developed or included in this report for either of these programs. There are approximately 40 nurse anesthesia and 12 nurse midwife students enrolled per year. Their cost per student is expected to be roughly equal to advanced practice nurses.

Dentist Clinical Training Costs

The University of Minnesota School of Dentistry provides a clinical setting for dentists and dental hygienists in training to provide services to patients as part of the students' education. These clinical services provided to patients are an integral part of the student education process and are required before licensing to practice is granted. Unlike other disciplines discussed in this report, dental students do not get their clinical training in other hospital or community-based settings. All of their clinical care experience is provided through their services to patients at the dental school clinic. However, the dental school is having difficulty in attracting an adequate number of clients so that the students are able to obtain the necessary amount of required clinical training for licensing.

The first factor making it difficult to attract clients is that care delivered by dental students is not performed as quickly and typically requires more patient time to complete a given procedure than would occur in a non-teaching setting. Secondly, there is also an increased risk of error due to the inexperience of the students (when compared to licensed dentists). Thirdly, the dental school is often not a convenient location for many potential clients. In order to attract patients to the dental school, services are offered at a substantial discount over similar services provided in a non-teaching setting. The dental school provides services at a significant discount. They estimate that the discount is as much as 40 percent (based on a data from a combination of national and regional surveys and journals) relative to the private practice (excluding managed care) environment. Costs, however, are *greater* than would be incurred in a non-teaching setting.

While student clinical income covers a portion of the costs of the services as well as instructional costs, state allocations are still necessary to assist in making up the deficit between operating costs and revenues. Further, as more patients are utilizing managed care dental services, it has become even more difficult for the dental school to attract enough patients to meet the clinical training needs of its' students. This financial situation, as well as the problems faced in providing clinical training experience for dental students required for graduation and licensing, is unique as compared to the other providers included in this study. Due to these fundamental differences, funding needs for dental education should be evaluated separately from the other areas of medical education discussed in this report.

Physician Assistant Clinical Training Costs

Currently, no physician assistant training programs exist in Minnesota. However, to help meet the projected demand for physician assistants in the future, two programs are being initiated in 1996. No costs are as yet available for these programs. As the financial procedures for these programs are designed, it is desireable that provisions be made to directly determine the clinical training costs of these individuals, and the subcommittee recommends that the state require the programs to do so.

Educational Revenues

Federal Revenues

Direct Graduate Medical Education (DME)

"Allowable direct graduate medical education (GME) costs include the salaries and fringe of residents; salaries and fringe of teaching physicians for their time spent supervising residents; administrative expenses; and institutional overhead allocated to residency programs. Medicare DME payments are based on hospital-specific per-resident costs as reported for fiscal year 1984, updated for inflation. This base is multiplied by the number of Medicare-eligible full-time equivalent (FTE) residents. The product of this step is then apportioned to Medicare on the basis of the hospital's ratio of Medicare inpatient days to total inpatient days. Total payments for DME to Minnesota are estimated to be $23,700,000 for fiscal year 1993" (MDH 1995).

Indirect Graduate Medical Education Adjustment (IMEA)

"The IMEA is a hospital-specific add-on to the hospital's DRG-reimbursement rates. This adjustment, added to each DRG payment to teaching hospitals, is based on a complex formula that includes factors such as the resident-to-bed ratio and the percentage of Medicare patients served. It is important to note that Medicare's IMEA is different from the indirect cost of graduate medical education (GME). The IMEA "was not designed to support teaching per se" (PPRC 1993); rather, it was meant to compensate teaching hospitals for their relatively higher inpatient operating costs, attributable to the disporportionate share of critically ill patients (i.e., different case-mix) and uncompensated care that is typical of such hospitals, the wide range of services and technologies they must offer, *and* the physician education process..." (MDH 1995). The Medicare IMEA payment for FY 1993 was $88.4 million.

Tuition

Medical Students

The estimated total cost of medical student education, $25.1 million ($45,645 x 550 students), is partially offset by an annual resident tuition of $14,616 per student per year for their first three years, and $3,654 for their fourth year at both campuses of the University of Minnesota. Non-resident students pay $29,112 per year for their first three years, and $7,278 for their fourth year. Virtually all of the University of Minnesota students pay resident tuition rates. Tuition for the Mayo Medical School is $9,925 per year for resident students and $19,800 for non-residents. Approximately 75 percent of Mayo medical students pay non-resident tuition.

Advanced Practice Nurses

The cost per student per year ($15,877) is partially offset by an annual tuition of an estimated $3,806 per nurse for Minnesota residents (162 students) and $7,612 per nurse for out-of-state (non-reciprocity) residents (10 students). The $15,877 per year in total clinical training costs, minus tuition, leaves an unfunded amount of $12,071 per resident student, and $8,265 for non-resident student which is then covered by an allocation from the state of Minnesota through the University of Minnesota General Education Fund. Thus, an estimated $2,730,844 (162 x $12,071 + 10 x $8,265) total cost per year is offset by $692,692 in tuition (162 x $3,806 + 10 x 7,612), resulting in approximately $2,038,152 in remaining clinical training costs to be covered by the state allocation. (As noted previously, nurse anesthesia and nurse midwife students are not included in these estimates.)

State Revenues for Medical Student/Resident Education

State Appropriations for Undergraduate Medical Education in Minnesota

State appropriations for undergraduate medical education include (all figures for FY 1993): (MDH 1995)

University of Minnesota:

- approximately $26 million to the Medical School as part of the state's "general appropriation for instruction;"
- $432,000 for the Primary Care Physician Training Initiative (funded through the state's Health Care Access Fund); and
- $889,000 to the Rural Physician Associate Program (RPAP) for third year medical students.

Mayo Foundation:

- $682,000 to the Mayo Medical Foundation for medical students who are Minnesota residents.[13]

[13] Approximately 40 students in FY 1993.

State Appropriations for Graduate Medical Education
State appropriations for graduate medical education include (all figures for FY 1993):

University of Minnesota:

- about $2.0 million for the University of Minnesota's Graduate Nursing Program;
- about $1.8 million for the University of Minnesota's Primary Care Physicians Initiative (funded through the state's Health Care Access Fund); and
- about $10.8 million to the University of Minnesota, representing the "hospital education offset" of the health sciences special appropriation.[14]

Mayo Foundation:

- $274,000 to the Mayo Medical Foundation for grants to family practice residents.

Other Programs:

- about $96,000 appropriated through the Higher Education Coordinating Board (HECB) for the rural physician loan repayment program;
- $41,000 for the HECB for loan repayment programs for mid-level rural practitioners and nurses who practice in nursing homes or ICF/MRs.

Total state appropriations for FY 1993 for medical education were approximately $43,014,000. Of that amount, the University of Minnesota directly received $41,032,000. Mayo received $956,000. The last three programs listed above together received $1,026,000.

Benefits from Trainees
While teaching institutions undeniably incur costs that are attributable to clinical training, they also secure the benefits associated with such training. Many of these benefits are hard to quantify, in part because the teaching, research, and service activities are so closely intertwined, and in part because it has not been necessary for facilities to track this information. Many of the benefits of medical education (and research) are intangible, such as the encouragement of technological innovation, but can result in enhanced service to patients.

Some of the benefits, however, are tangible. The primary tangible benefit to teaching institutions from medical education is that during clinical training, residents are not only being educated, they "learn by doing" and, thereby provide to patients essential health care services, which, in turn, result in a financial benefit for teaching institutions. That benefit amount will vary from institution to institution depending upon the degree of supervision that each

[14] The University's hospital education offset is used to "offset costs associated with residency and allied health programs and for programs that, because of low volume of service, specialized needs, or developmental nature, must be supported by the cost competitive" (U of M Budget Request 1992-1993). Thus, it is similar to the Medicare IMEA and not specifically meant to cover education costs per se.

program requires for their trainees. Further, the amount of benefit also varies by the skill of the student (i.e., a first or second year medical resident does not provide as much benefit to an institution as a fourth year resident who is much more experienced and, consequently, requires less supervision). The estimate of benefits from trainees for 1993 was calculated to be $47,500,000 million. The basis for this estimate is given in Appendix C.

Should the funding for research and medical education come from the same source?

The activities of medical education and research are closely tied, with the activities being performed simultaneously at many of the institutions. It would be logical to derive these funds from the same source(s). However, there is no reason why funds could not come from other sources if they were available.

V. Recommendations

The following recommendations are based on the work of the Structural Options and Financing Options Subcommittees and three years of research and debate on the issues of funding for medical education and research activities.

• **Establishment of Medical Education and Research Trust Fund**

The Commissioner of Health shall request that the Legislature create and fund a Medical Education and Research Trust Fund with separate accounts for education and research. These funds would be distributed by the Commissioner to eligible programs. The distribution of funds will be accomplished through the application of a formula to the amount of funds available for distribution. Some of the guiding principles for the development of this formula for education are:

- it is to be equitable (i.e, small programs as well as the major teaching institutions will be included and the funding divided fairly);
- it should provide incentives for areas of training that are deemed appropriate;
- it should not encourage the expansion of any area of training where there is an anticipated "oversupply" of providers.

Market forces are having a significant impact on the supply of providers, particularly influencing the mix of trainees. Further, while the total number of trainees are determined by individual decisions of the training facilities, market forces are influencing these decisions as well. The principles contained in the distribution formula are, therefore, designed to reward those training facilities most closely following the market lead in determining both the number and type of trainees to educate. Application for funding from the Medical Education and Research Trust Fund will be on a strictly voluntary basis.

• **Creation of the Medical Education and Research Cost (MERC) Advisory Commission**

The Commissioner of Health shall appoint an advisory commission. The advisory commission will assist in the development and implementation of a mechanism by which to administer the Trust Fund to be set up for funding the activities of medical education and research. They will also continue to study the costs and benefits of medical education and research, funding options, and associated workforce issues. The commission would consist of appointed members and be staffed by staff of the Health Department (similar to the structure of the current MERC Advisory Task Force). The Commissioner shall consider the interests of all stakeholders when selecting commission members. Members should include representation of public and private academic health centers, teaching hospitals, other accredited training programs, managed care organizations, health care group purchasers, other providers, and

community leaders. Commission members shall represent both urban and rural interests, and include both ambulatory and inpatient care perspectives.

• **Establishment of Financing Mechanism**

The Department is requesting an annual appropriation of $10 million for the Trust Fund with first year funding to come from general revenues for FY 1997.

The $10 million estimate is based on preliminary and ongoing work by the MERC Advisory Task Force to identify the costs and revenues associated with teaching and research programs to determine the amount "at risk" in an increasingly competitive health care environment. Staff of the Health Economics Program's initial and preliminary estimate of the amount at risk, based on the current mix of teaching programs, is approximately $37 million. The Task Force recommended that public funds be used to fund only a *portion* of this deficit and recommended funding at 25 percent, representing an estimate of $10 million per year. The cost/revenue calculations will continue to be refined as new and better information becomes available. *This estimate does not include a projection of anticipated cuts in federal Medicare funding for medical education.*

The MERC Advisory Task Force did not recommend a specific source of funding. However, they did indicate that the most desirable option for *new* base funding is an allocation from the general fund. This is indeed the most broad-based tax available in which virtually everyone benefitting is contributing toward the cost. In addition, the Task Force recommended that the self-insured contribute to the Trust Fund and encourages the Department of Employee Relations to contribute their "fair share" for the state's self-insured business to the Trust Fund as a model to all other self-insured plans in this state. This may be set up as a "contribution in lieu of tax." A certain amount paid per employee has been suggested.

• **Transfer of Existing Medical Education Funds to the Medical Education Trust Fund Account**

In addition to the base funding of $10 million, other sources may be considered for the Trust Fund. For example, the Department of Human Services (DHS) currently includes an "add-on" to the capitation rates for their Pre-paid Medical Assistance Program (PMAP) for medical education costs. If federal funds are block granted to the state, there may be opportunities for the medical education funds to be allocated through a different mechanism. The new Medical Education Trust Fund Account may be one alternative. By allocating Medical Assistance education funds through the Trust Fund, it is anticipated that there would be fewer administrative costs as well as potential better targeting of scarce resources. Should other such funding sources of medical education be identified in the future, they could also be consolidated into the Medical Education Trust Fund Account if it is deemed appropriate by the legislature.

• **Development and Implementation of Reporting Requirements**

Develop and implement a standard reporting format for the collection of medical education and research costs from all entities receiving funding from the Medical Education and Research Trust Fund. Reports will be submitted to the Commissioner of Health. *(NOTE: The Department of Health already has authority under Minnesota Statute 62J to collect certain revenue and expenditure data and has, since 1993, been collecting data on provider expenses and revenues for medical education and research. Any new initiatives should be coordinated with ongoing data collection activities.)*

• **Adjunct Recommendation — Increase Funding for Population-Based Research**

The MERC Advisory Task Force supports an increase in funding, separate from the Trust Fund, for Minnesota-specific, population-based research. This special allocation to the Minnesota Department of Health (MDH) should come from the general fund and should not supplant existing allocations, but should result in a net increase in total funds available for this key aspect of health care research. The research may be conducted by MDH or contracted out to other appropriate entities.

• **Continue Work on Health Care Research**

The Commissioner of Health will, with the advice of the Medical Education and Research Cost Advisory Commission, continue the work of developing strategies to identify the cost of health care research that is funded by patient care dollars and mechanisms to increase funding for those activities.

• **Continued Refinement of Standard Care Requirement**

The MERC Advisory Commission should continue to work on a policy that would maintain dollars available for clinical research[15] in Minnesota by requiring all group purchasers operating in the state to cover *standard* care for those patients involved in clinical trials in Minnesota. This includes research involving investigational procedures and technology and Minnesota-specific outcome medical research conducted by group purchasers and providers to optimize cost-effective care. It excludes research sponsored by a federal agency or other entity. Plans would be required to cover the costs of care that would be provided if the patient were NOT involved in a clinical trial. This policy must be carefully designed so that health plans would not be required to cover additional costs over and above those costs which would have normally incurred through the standard course of treatment. In other words, standard care costs in clinical trials must not exceed the costs associated with standard

[15] In the context of this report, "clinical research" refers to research conducted with human subjects (or on material of human origins such as tissues, specimens, or cognitive phenomena) with whom the investigator directly interacts in either an outpatient or inpatient setting. This includes the development of new technologies; mechanisms of human disease; therapeutic interventions; and clinical trials (NIH 1990).

treatment. *Note: Much work on definitions is still needed before such a policy could be implemented. Not all Task Force members agreed with this recommendation.*

• **Establish Voluntary Pooled Research Initiative**

Require the Commissioner to establish a mechanism through which group purchasers, in a cooperative voluntary effort with the research community, will select and fund a limited number of randomized, prospective studies. The purpose of the studies is to determine the effectiveness (both in terms of cost and patient outcomes) of certain diagnostic and therapeutic modalities. These studies will be selected by a committee of representatives of researchers, providers, and group purchasers. Selection of a project by this committee will result in a voluntary payment of all costs (as defined in the study proposal) incurred for the selected studies by the group purchasers operating in Minnesota. The number of studies may be limited as necessary, based upon the determination of the committee, taking into account the cost of studies already approved.

VI. Additional Background Information

This section of the report reviews the cost and funding sources, which are outlined in the preliminary report, for undergraduate and graduate medical education nationwide and then in Minnesota.[16] It also outlines the processes initiated by the MERC Advisory Task Force to obtain more reliable state data. A discussion of financing for ambulatory training is presented next with a section on the financial benefits associated with medical education following.

The second major area discussed in this section is financing for health care research. A brief overview is given along with a discussion of research costs and what portion of those costs should be replaced by an alternative funding mechanism. As noted, Minnesota is frequently not comparable to the rest of the nation; thus, the national data presented in this section do not necessarily apply to Minnesota.

Financing Medical Education

The clinical training of physicians, dentists, advanced practice nurses, and physician assistants all add to patient-care costs at teaching institutions. It is generally agreed that physician training, because of its length, is the most costly. Accordingly, this section will primarily focus on the cost of this element of medical education.

Calculating the cost of physician education is difficult, because:

- The training of physicians, particularly graduate medical education (GME), is a classic example of a joint-product enterprise. Medical education and research are provided in conjunction with patient care and it is extremely difficult to tease out the relative cost of each because the activities often overlap.

- "The academic health centre is an organism with a vast array of hidden costs [e.g., medical education and research] in which charges collected for one purpose are used to pay for something else. The trade jargon is 'cross subsidization'" (Culliton 1993). Untangling the web of costs and cross subsidies that has been built up over the years is perplexing—even for some academic health centers themselves.

- Much data—including such basic information as the number of contact hours between educators and trainees—is variable and often not available.

The lack of reliable cost estimates does not, however, indicate a failure on the part of teaching institutions; instead, it reflects the fact that our historical reimbursement-based health care

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[16] Much of the material in this section is quoted directly from the 1995 Department of Health, Health Economics Report, *Medical Education and Research Costs (MERC) In Minnesota's Reformed Health Care System: An Interim Report from the Commissioner of Health to the Legislature.*

system has neither required nor provided them the incentive to monitor the cost of medical education.

Undergraduate Medical Education

Costs

The four-year medical school curriculum provides education in the basic sciences and clinical sciences. Education in the basic sciences is primarily didactic (formal lectures, small group discussions and seminars, and laboratory sessions). Clinical training usually includes preceptorships, in which medical students observe a physician in practice, and clinical rotations (or clerkships), with the student role ranging from observing to actual participation in the delivery of care under the supervision of medical residents and faculty. The clinical training is diffused throughout the four-year curriculum. The cost of the medical students' clinical training—the portion of undergraduate medical education of concern here—is not recognized explicitly by any payment system.

As mentioned previously, there are virtually no systematic studies of the costs of undergraduate medical education (Ginzberg et al. 1993). The notable exception is the 1971 Institute of Medicine's national study of health professions education. The study reported an average annual education cost per medical student of $12,650 with a range from $6,900 to $18,650 (IOM 1974), or, adjusted to 1990 dollars, $38,000 per medical student with a range from $21,000 to $56,000 (Ginzberg et al. 1993). Other more recent estimates of undergraduate medical education costs vary widely.

The cost of undergraduate medical education in Minnesota is estimated from this Ginzberg study. The middle of the range, $38,000, was chosen as the most appropriate estimate. That number was then adjusted to 1993 dollars resulting in an average of $45,645 per student per year.

Funding Sources

The funding of undergraduate medical (and other health professional) education differs from the funding of most other professional education, since medical education requires, in addition to classroom and laboratory instruction, direct patient care experience. For at least the past 30 years undergraduate medical education has been financed by medical service revenue, research grants, state and local appropriations, students' tuition and fees, university support, gifts, and endowment earnings.

While these sources have remained the same nationally, their relative contributions have changed dramatically. For example, in 1960 medical service revenue accounted for only 6.4 percent of total medical school revenue; by 1993 it came to 47.5 percent of total revenue. In contrast, for the period 1960 - 1993, the share of total revenues from federal research grants fell from 42 percent to 19.1 percent (Ganem et al. 1994). The contribution of student tuition and fees has ranged between 4 and 6 percent.

Graduate Medical Education

Costs

Graduate medical education (medical resident education) has both direct and indirect costs. Direct costs include residents' salaries and fringe benefits, supervising faculty salaries and fringe benefits, and support required to maintain training programs, including program administration and classroom space. Direct medical education (DME) costs can be identified from the teaching institution's accounting system. Yet, despite general agreement on the definition of direct costs and the requirement that all teaching hospitals file annual Medicare cost reports identifying DME costs, "differences in accounting practices both render the estimates of direct costs inaccurate and make it impossible to compare costs across hospitals" (Gold 1994).

Indirect medical education (IME) costs refer to the incremental costs associated with clinical training. They include the costs associated with such things as the greater use of ancillary services because of the residents' inexperience; the tendency to try to make a more detailed diagnosis for educational purposes; the time delay due to oversight and consultation; the decreased productivity of nurses and other employees who have to assist the new residents; and increased record keeping requirements (Lave 1989). They do not directly include costs associated with the increased casemix complexity and the wider range of services and technologies that generally accompany teaching (and research) activities. Indirect medical education costs cannot be identified from institutions' accounting systems and are thus even more difficult to estimate than DME costs.

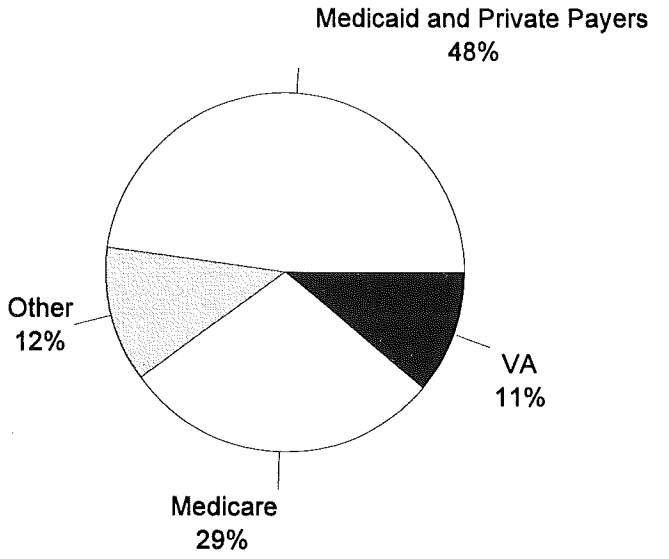
Funding Sources

Graduate medical education has traditionally been funded by patient care revenues. Generally, the cost of GME has been considered a part of hospital costs and funding for GME has been tied to hospital reimbursement. Figure 1 (next page) shows the relative contribution of various funders to the *direct* costs of GME. No similar figure is available for funding sources for the *indirect* costs of GME.

Federal Sources

While little information is available on the total cost of GME, considerable data exists on federal payments for GME. The federal government is the largest explicit financing source for GME. The VA and Department of Defense, combined, finance the training of about 15 percent of residents. The federal government also subsidizes (through Title VII of the Public Health Services Act) the training of physicians in selected specialties, including family practice, general internal medicine, and general pediatrics. Most federal financing for GME, however, is through Medicare.

Figure 1.
Sources of Total National Expenditures for the Direct Costs of Graduate Medical Education, 1991



"Other" category includes Department of Defense, state and local support, and faculty practice plans
Source: Association of American Medical Colleges (AAMC 1993a)

Unlike other third-party payers, Medicare makes discrete payments to teaching institutions for its portion of GME costs. The primary components to Medicare GME payments are:

- *Direct Medical Education (DME) payments*
  "Allowable direct GME costs include the salaries and fringe of residents; salaries and fringe of teaching physicians for their time spent supervising residents; administrative expenses; and institutional overhead allocated to residency programs. Medicare DME payments are based on hospital-specific per-resident costs as reported for fiscal year 1984, updated for inflation. This base is multiplied by the number of Medicare-eligible full-time equivalent (FTE) residents...The product of this step is then apportioned to Medicare on the basis of the hospital's ratio of Medicare inpatient days to total inpatient days" (MDH 1995).

- *Indirect Medical Education Adjustment (IMEA)*
  "The IMEA is a hospital-specific add-on to the hospital's DRG-reimbursement rates. This adjustment, added to each DRG payment to teaching hospitals, is based on a complex formula that includes factors such as the resident-to-bed ratio and the percentage of Medicare patients served." ***It is important to note that Medicare's payment for IMEA is different from and not directly tied to the indirect costs (IME) of graduate medical education.*** "The IMEA "was not designed to support teaching

per se" (PPRC 1993); rather, it was meant to compensate teaching hospitals for their relatively higher inpatient operating costs, attributable to the disproportionate share of critically ill patients (i.e., different case-mix) and uncompensated care that is typical of such hospitals, the wide range of services and technologies they must offer, *and* the physician education process..."[17] (MDH 1995).

Other Sources

Other funders, including private third party payers, generally do not make separate payments for GME. They support GME only to the extent to which they are willing to pay the teaching hospitals' (relatively higher) charges, which include the cost of GME. As previously noted, their willingness to continue to pay these higher charges is diminishing as price competition increases.

Medicaid funding for GME has decreased in recent years. Only a few states, not including Minnesota, follow Medicare and explicitly fund GME. Even states recognizing direct costs or including an indirect cost adjustment may provide little support for GME since many state Medicaid programs pay hospitals below cost.

Cost Estimates of Graduate Medical Education in Minnesota

The MERC Advisory Task Force explored several alternative strategies to estimate the direct and indirect cost of GME in Minnesota. During the preliminary phase of the MERC study, MDH staff asked five major teaching institutions in Minnesota to estimate the total costs for education during fiscal year 1992. The figures obtained, however, were not usable primarily because of differing definitions and accounting methods among institutions.

In the second year of the MERC study, the Task Force established a Cost of Education Subcommittee to seek more accurate estimates of medical education costs in Minnesota. In addition to asking the teaching institutions to report their costs (the strategy followed in MERC I), the other strategies were to use data from the Medicare Cost Reports and average annual per resident teaching costs.

Ultimately, the subcommittee recommended, and the MERC Advisory Task Force adopted, the following strategies to estimate GME costs in Minnesota:

- An ad hoc group of financial officers for Minnesota teaching institutions was convened to develop a cost formula to estimate the direct cost of GME. The group adapted a methodology developed by Deloitte & Touche that has been successfully used to calculate the direct costs of GME for several teaching institutions nationwide.

[17] Medicare also provides an add-on payment directly to physicians for services in which they involve residents. To receive this Medicare GME physician payment, the physician must qualify as an "attending physician" on the same basis as if the physician had personally furnished the service. There is no estimate on these types of payments (Gibbs Brown 1994).

- The Minnesota Department of Health engaged Lewin-VHI to estimate the indirect costs of GME in Minnesota. Lewin-VHI applied to Minnesota the methodology used in their project referenced above estimating the indirect costs of GME nationwide and provided preliminary estimates to the Commissioner of Health (Dobson et al. 1995).

Funding Sources for Graduate Medical Education in Minnesota

The major funding sources for GME in Minnesota are the same as nationwide (refer back to Figure 1). For fiscal year 1993, Medicare GME payments to Minnesota teaching hospitals totaled about $112 million ($23.6 million for DME and $88.4 million for IMEA). These payments covered 1,365 Medicare-eligible FTE residents.[18]

Minnesota's Medicaid program pays a portion of an all-inclusive hospital charge. To the extent this charge includes direct and indirect medical education costs, Medicaid payments partially reimburse these costs. Though the state has made no effort to explicitly fund education costs through its Medicaid program, the fact that such costs are not separated out means the state has also taken no steps to limit what it pays for medical education (that is, Medicaid payments to teaching hospitals are not reduced by some amount because the state does not want to pay the "education increment"). The Minnesota Department of Human Services (DHS) does not have reliable estimates of Medicaid payments for medical education. DHS also includes an "add-on" to the capitation rates for their Pre-paid Medical Assistance Program (PMAP) for medical education costs. If federal funds are block granted to the state, there may be opportunities for the medical education funds to be allocated through a different mechanism. The new Medical Education Trust Fund Account (discussed in Structural Options Subcommittee Report section) may be one alternative. By funneling medical education funds through the Trust Fund, it is anticipated that there would be fewer administrative costs as well as potential better targeting of scarce resources.

Financing Ambulatory Training

It is now generally agreed that more training must occur in ambulatory settings. The delivery of health care services continues to shift as a growing number and spectrum of conditions and patients are now treated in ambulatory settings (primarily clinics, outpatient departments, and physician offices). The emphasis on ambulatory care is increasing in all specialties. On

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[18] The total number of residents in Minnesota in 1993 was about 2240. The following adjustments are made to determine the number of Medicare-eligible FTE residents:

- residents beyond initial certification (plus 1 additional year) or beyond 5 years of training are counted as 0.5 FTE.
- foreign medical graduates (FMGs) who have not passed the Foreign Medical Graduate Examination in Medical Sciences exam are excluded.
- residents in non-approved programs are excluded ("approved programs" are those that lead to certification in a specialty listed in the AMA's Directory of Training Programs, are accredited by ACGME as geriatric fellowship programs, or are approved by various dental, podiatry, or osteopathic organizations).
- residents in ambulatory settings not affiliated with a teaching hospital, engaged full time in research, or at the VAMC are excluded.
- Mayo residents in any clinic (as opposed to hospital) setting are excluded.

average, physicians now spend more than two-thirds of their professional time seeing patients in an ambulatory setting. Ambulatory training provides experiences that reflect what practitioners will actually see in practice, in terms of sites, patients, diagnoses, and treatments.

Moving medical education out of hospitals and into ambulatory settings faces a number of formidable barriers—chiefly, but not solely, financial. The settings for medical education are linked to the distribution of funds. Currently, most such payments are made to hospitals. For example, Medicare GME payments are available only to teaching hospitals; Medicare will reimburse ambulatory training only if the teaching hospital incurs "all or substantially all" of the cost of the training program. Medicare GME payments are not available for ambulatory training programs in free-standing ambulatory care centers or other facilities that are not part of the teaching hospital. Thus, the current GME funding structure penalizes expansion of GME training in ambulatory settings beyond the teaching hospital.

When education is introduced into an ambulatory setting, costs often go up while revenue remains flat or even declines as a result of reduced productivity (Bentley et al. 1989). Clinical revenue generated by faculty in ambulatory settings, particularly for primary care services, is believed to be insufficient to cover the additional costs of training. However, study findings to date have been conflicting and inconclusive.

Other barriers to developing ambulatory training programs include teaching hospitals' "...reliance on residents to meet institutional goals. Just as teaching institutions have been served by increases in residency positions, so have they benefited from the continued focus on inpatient training" (PPRC 1993). Also, though residents' and medical students' participation in patient care is an accepted part of care in teaching hospitals, some patients—particularly those in higher socio-economic groups—may be less willing to accept such trainee participation in ambulatory settings (IOM 1989). Finally, if ambulatory training moves from teaching hospitals and large, multi-specialty clinics to smaller sites, e.g., physician offices, concerns will be raised about the quality of the training program and the ability to provide adequate oversight and supervision (PPRC 1993).

Strategies to expand ambulatory training will need to address all of these barriers. It is noteworthy, for example, that the promising efforts of the University of Minnesota's "Primary Care Physician Training Initiative" to expand generalist training in ambulatory settings are not financed by traditional funding sources, but with dedicated state funds (U of MN 1995). According to the University's plans to expand these efforts, the increased budget request "take(s) into account the increased cost and lack of hospital subsidy to train primary care residents in ambulatory (outpatient) settings."

Financial Benefits Associated with Medical Education

While teaching institutions undeniably incur costs that are attributable to clinical training, they also receive the benefits associated with such training. Many of these benefits are difficult to quantify, in part because the teaching, research, and service activities are so closely

intertwined. Among the more intangible but nonetheless real benefits teaching institutions receive from medical education are:

- medical education (and research) encourages technological innovation, which, notwithstanding the costs involved, can be of benefit in treating patients and hence has a service benefit;

- if there is insufficient patient demand to support a full-time sub-specialist, the teaching and research opportunities associated with teaching hospitals effectively provide part-time work for such specialists and give the teaching hospitals access to skills and the ability to provide sub-specialty services that might otherwise not be available to them;

- health care clinicians involved in teaching and research activities tend to acquire skills beyond the usual competence of other clinicians (e.g., an analytical disposition towards examining issues more critically and exploring the links between cause and effect more carefully) that can translate directly into better patient management and higher quality care (NZ Ministry of Health 1994).

The primary tangible benefit to teaching institutions from medical education is that during clinical training, residents are not only being educated, they "learn-by-doing" and, thereby, provide to patients essential health care services, which, in turn, result in a financial benefit for teaching institutions. In effect, residents are both students and employees; they are on-the-job trainees for whom providing patient care is a major part of the learning process.

Training programs are generally thought to raise the average cost per case at teaching institutions. Although Minnesota teaching institutions have become more efficient and cost effective in response to a more competitive health care environment, their costs are likely to remain somewhat higher than non-teaching institutions. These higher costs are due to a number of factors including the inefficiency of residents compared to full-time practitioners and the negative impact of residency programs on the productivity of other staff members. On the other hand, "when residents are used in place of physicians in delivering a unit of patient care, higher volumes of services and lower average costs of production may result" (Campbell et al. 1991). While residents are more limited in the services they can competently provide and less efficient in delivering patient care than practicing physicians, their stipends are considerably lower than the physicians' salaries. The benefit to the training institution varies greatly between institutions and also depends upon the experience of the resident.

Substitute Labor Costs

Estimating substitute labor costs is one method to quantify the financial benefits of health care services provided by trainees. Residents substitute for other patient care inputs—that is, if residents do not provide patient care, other (usually more highly compensated) clinicians would have to. Who can function as a substitute for a resident depends on a number of variables, including the particular service and the level of training of the resident (generally, resident productivity increases and the need for supervision decreases with the level of

training). The per-trainee cost of medical education varies considerably with the stage of training; generally, costs decrease over time, as residents acquire clinical skills, require less supervision, and are able to provide more patient services. There is some evidence that the costs of some residency programs may balance out over the length of the program; thus, for example, a three-year residency program may lose money during the first year, break even the second year, and generate a surplus the third year (when resident-generated patient revenues exceed training costs).

To compute the net cost of medical education using this method, total teaching costs would have to be offset by the estimated cost of providing medical services by substitute, fully-trained physicians or other clinicians. The net cost of a training program may thus be determined by asking the following question: given that there is a training program at a teaching institution that serves X patients, what would be the cost impact of closing down the program while maintaining services for such patients through full-time practitioners who replace the trainees (Delbanco and Calkins 1988)?[19] Studies to estimate the financial benefit of residency programs yield disparate results.

One study examining substitute labor costs for a residency program concluded that in some settings a fully trained physician would be needed to perform at least 20 percent of the resident's activities if the resident were not available and 35 percent of the resident's activities could be substituted for by mid-level practitioners (Knickman et al. 1992). The remainder of residents' time is spent on education-specific and personal activities. This study was chosen as the basis for estimating the benefits for residents in Minnesota. Further discussion and explanation is in the chapter titled, "Financing Options Subcommittee Report."

Workforce Issues

Health professional workforce policies are an essential component of health care reform and were considered by the MERC Advisory Task Force when discussing alternative funding mechanisms. An appropriately trained workforce with an appropriate number, mix, and distribution of health care professionals can significantly increase access to care, ensure the quality of care, and help contain overall costs. Discussions about the health care workforce usually focus on the supply and demand of physicians. However, the number, specialty mix, and geographic distribution of non-physician providers (NPPs)[20] must also be considered. A brief review of the major issues is given in the next section.[21]

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[19] Clinical training of students is generally seen as an unequivocal cost since they are in the clinical setting predominately to learn how to provide patient care rather than actually provide it.

[20] As used in this report, NPPs refers to physician assistants and all advanced practice nurses.

[21] For a more complete discussion, please refer to the chapter on "Workforce Issues" in the 1995 Department of Health, Health Economics Report, *Medical Education and Research Costs (MERC) In Minnesota's Reformed Health Care System: An Interim Report from the Commissioner of Health to the Legislature.*

Workforce Imbalances

There are currently four imbalances in the existing health professional workforce. The first is a growing oversupply of physicians. Nationally, over the past 25 years, the number of non-federal, active physicians (MDs only) has grown at a much faster rate than the general population growth, and is projected to continue to grow (AMA 1994b). The physician supply in Minnesota has grown at a similar rate. Without specific action to address this issue, Minnesota is projected, during the period 1995 - 2000, to increase the physician-to-population ratio in Minnesota by about 7.5 percent (BHPr 1992).

The supply of non-physician providers (NPPs) has also grown rapidly over the past 25 years. There is disagreement about the need for additional NPPs. The conventional wisdom appears to be that there are too few NPPs. Consequently, there is a concerted effort in Minnesota and nationwide to increase their numbers by establishing new training programs and expanding existing ones. In the last three years the number of nurse practitioner programs in Minnesota has doubled to six. Also, since 1992, there are two new master's degree programs in nursing and three new NP programs at the master's level in Minnesota. Finally, the state's first two physician assistants programs are being developed at Augsburg College and Mankato State University. However, whether the nation is training too many, too few, or just enough non-physician providers has never been studied systematically (Mullan et al. 1993).

As of December 1993, the Office of Rural Health and Primary Care (ORHPC) counted 2,825 dentists licensed to practice in Minnesota reporting a primary address of practice in the state. The number of dentists in the state has been remarkably steady over the past decade. The MERC study has not explored whether this number is too low or too high for Minnesota.

The second area of workforce imbalance is in specialty mix. While there is some debate about whether the number of generalist physicians needs to be increased, virtually everyone agrees that there are now too many specialists. Current projections from the federal Bureau of Health Professions indicate that in the year 2020, only 31 percent of practicing (MD) physicians will be generalists. As with the concern of oversupply of providers, there is little solid data available as to whether the number of generalists versus the number is specialists is disproportionate to need or not.

The third facet of workforce imbalance, the geographic maldistribution of clinicians, continues to leave some rural and inner city communities underserved. Despite the increase in physician supply, the number of areas with an inadequate supply of generalist clinicians as well as the number of Americans without access to primary care services has actually increased over the past decade. Increasing the number of physicians, by itself, has not solved the problem of underserved areas. The vast majority of the additional physicians established practice in urban areas. Overall, physician availability in rural counties is now less than one-third of the U.S. average. This geographic maldistribution is greatest for specialists but holds true for generalist physicians as well. Family and general physicians have long provided the bulk of care in rural areas. But there are now too few of these generalists to replace retiring

physicians. Other generalist physicians—general internists and general pediatricians—disproportionately favor metropolitan areas (Barnett and Midtling 1989).

In Minnesota, 65 percent of family and general practice physicians report primary addresses of practice in urban counties and 35 percent in rural counties—roughly approximating the urban-rural distribution of the state's overall population. In contrast, only 10 percent of Minnesota's internists and 7 percent of pediatricians practice in rural counties (MDH 1994b).

The fourth facet of workforce imbalance, the skills and competencies of health personnel, must be addressed. Clinicians will need new skills and competencies in order for them to function effectively in tomorrow's system. The increased integration of Minnesota's health care system, for example, will mean that teams of health care professionals, rather than a single clinician, will increasingly be used to provide medical services and manage people's health. This requires greater interdependence of and cooperation among different types of clinicians. Managed care organizations, in particular, will require that health care professionals with different kinds and levels of expertise must be combined into an "efficient and patient-responsive workforce" (Hadley 1994). The medical education system must prepare clinicians to take on these new roles and responsibilities associated with the delivery of care by teams. This will mean that "the relatively rigid lines that currently separate one department from another, that separate the medical school from the nursing school and the public health school, and the tertiary care hospital from the community hospital and office-based primary care, all will have to be blurred" (Hadley 1994).

Health Care Research

Health related research stretches on a "continuum extending from basic biomedical research through behavioral, clinical, and applied research to traditional health services research" (AAMC 1993b). Most health care research occurs in academic health centers and the majority of federal funding for such research is awarded to these centers. The tripartite mission of academic health centers—teaching, research, and patient care—makes them particularly well-suited to conduct research. Close proximity between researchers and patients, for example, stimulates new research and can speed the transformation of new knowledge into cutting-edge patient care. In Minnesota, Mayo and the University of Minnesota conduct the majority of health care research, with the balance of research conducted in hospitals, clinics, and other health care facilities throughout the state.

Like medical education, health care research has direct and indirect costs. Direct costs include the salaries and fringe benefits of personnel (e.g., the principal investigators and research assistants), supplies and materials (including computer time), and program administration. Indirect costs "involve the increase in patient care costs, other than those directly financed by the project, perhaps due to a longer hospitalization or the development of complications as a result of the research protocol" (Anderson and Lave 1987). These added costs of doing research are particularly difficult to estimate.

External, project-specific funding typically covers the direct cost of research but not the full indirect costs, which must then be covered by other revenues (such as patient out-of-pocket and/or third-party payments). In many grant-supported clinical trials of cancer therapy, for example, many components of the research, "such as data collection, statistical analysis, the cost of unapproved medicines, research-related laboratory studies and radiologic evaluations, and support staff," are largely funded by the grant, but "the costs of clinical care for the underlying medical conditions have generally been covered by third-party insurance" (Peters and Rogers 1993). Sometimes third-party payers cover both the costs of standard care (i.e., the care for the patient's underlying condition) as well as the incremental cost of the research (i.e., the additional research interventions the patient receives).

Unlike funding for medical education "the vast majority of funding for [health care] research comes from resources other than payment for patient care" (AAMC 1993b). The federal government is the single largest source of funding for such research, most of it through the National Institutes of Health (NIH). In addition, significant funding comes from private firms, including pharmaceutical, device, and equipment manufacturers. Limited funding for research is provided by foundations and other non-profit organizations, state government, and individuals. In addition to these dedicated external funds, research institutions use revenues from a variety of other sources to cover research costs—typically the indirect costs, but for non-grant-supported research the direct costs as well.

Finally, there is an unknown (but possibly significant) amount of health care research that is "not supported by funded grants or even explicitly acknowledged" but "simply funded through the introduction of inefficiency into the patient care process by lengthened operating room times, extra time spent in the radiology suite, or by use of other added resources in investigation, paid for by purchasers of medical care" (Heyssel 1984). These kinds of "impromptu investigations...often lead to real innovation in clinical practice" and are often first publicized through publication in peer-reviewed journal and subsequent translation into practice (Heyssel 1984).

Cost of Health Care Research in Minnesota

For the preliminary MERC report, five major teaching institutions in Minnesota were asked to report their total expenditures for health care research during fiscal year 1992. The reported combined expenditures were nearly $217 million (MDH 1994a). This estimate has not yet been updated.

The MERC Advisory Task Force attempted to estimate research finances for all Minnesota institutions engaged in health care research. A schema of research finances was developed based on three major categories: revenue from external funding sources, institutional revenue used to cover research costs, and unfunded research costs. Included in the institutional revenue category are patient out-of-pocket and third-party payer payments that are used to cover research costs—these payments are the focus of the MERC study. Data have been incomplete and, to date, unusable.

Portion of Research Costs to be Replaced by Alternative Funding Mechanism

The MERC legislation explicitly identifies the portion of research costs that should be considered in developing an alternative funding mechanism. The bulk of health care research in teaching and research institutions is directly funded through external sources, including the National Institutes of Health (NIH) and other federal agencies or departments, pharmaceutical and other private companies, private foundations, donations, and state appropriations. The MERC legislation, however, is concerned only with the cost of research activities that are either unfunded or impose service costs that are not covered by research grants (such as longer in-patient stays or extra outpatient visits as well as staff and infrastructure costs) and only insofar as these costs are covered by patient out-of-pocket payments or payments made by third party payers. Research costs that are covered by any other source are explicitly excluded. The MERC Advisory Task Force has not been able to formally quantify the amount of research conducted in Minnesota that is funded solely by patient out-of-pocket and third-party payments.

References

AAMC. *Academic Medicine and Health Care Reform: Graduate Medical Education.* Association of American Medical Colleges, Washington, D.C. 1993.

AAMC. *Academic Medicine and Health Care Reform: Health-Related Research.* Association of American Medical Colleges, Washington, D.C. 1993.

American Medical Association. *Physician Characteristics and Distribution in the U.S.* American Medical Association. Chicago. 1993.

Anderson, G.F., PhD, Lave, J.R. Financing Graduate Medical Education and Biomedical Research: Whose Responsibility? *Health Policy.* 1987; 7: 3-12.

Barnett, P.G., Midtling, J.E., MD. Public Policy and the Supply of Primary Care Physicians. *JAMA.* 1989; 262: (20) 2864-2868.

Bentley, J.D., PhD, Knapp, R.M., PhD, et al. Education in Ambulatory Care - Financing is One Piece of the Puzzle. *New England Journal of Medicine.* 1989; 320: (23) 1531-1534.

Bureau of Health Professions (BHPr). *Health Personnel in the United States.* Eighth Report to Congress. Rockville, Maryland. 1991.

Campbell, C.R., PhD, Gillespie, K.N., PhD, et al. The Effects of Residency Training Programs on the Financial Performance of Veterans Affairs Medical Centers. *Inquiry.* 1991; 28: 288-299.

Committee on Research. *Looking to the Future: Recommendations to Ensure Funding for Medical Research in the Climate of Cost Containment.* Medical Alley, St. Louis Park, MN. 1994.

Culliton, B.J. Health Research Feels the Chill. *Nature.* 1993; 366: 200-202.

Delbanco, T.L., MD, Calkins, D.R., MD, MPP. The Costs and Financing of Ambulatory Medical Education. *Journal of General Internal Medicine.* 1988; 3: S34-S43.

Dobson, A., PhD, Coleman, K. *Analysis of Inpatient IME Costs in the State of Minnesota.* Lewin-VHI, Inc. Fairfax, VA. 1995.

Dobson, A., PhD, Coleman, K., et al. *Analysis of Teaching Hospital Costs.* Lewin-VHI, Inc. Fairfax, VA. 1994.

Ganem, J.L., CPA, Beran, R.L., PhD, et al. Review of US Medical School Finances, 1993-1994. *JAMA*. 1995; 274: (9) 723-730.

Gibbs Brown, J.G. (Inspector General). *A Study of Graduate Medical Education Costs.* Department of Health & Human Services, Washington, D.C. 1994:1-19.

Ginzberg, E., Ostow, M., et al. *The Economics of Medical Education.* New York: Josiah Macy Jr. Foundation, 1993.

Gold, M., Chu, K. *Financing of Academic Medical Centers and Graduate Medical Education Under Competitive Systems with Managed Care.* Washington, D.C.: Mathematica Policy Research, Inc., 1994.

Hadley, J. Teaching and Hospital Costs. *Journal of Health Economics.* 1983; 2: 75-79.

Heyssel, R.M. Constrained Resources in Medical Education and Research. *Health Affairs.* 1984; 3: (4) 110-116.

Institute of Medicine (IOM). *Primary Care Physicians: Financing Their GME in Ambulatory Settings.* Washington, D.C.: National Academy Press, 1989.

Kassirer, J.P., MD. Academic Medical Centers Under Siege. *New England Journal of Medicine.* 1994; 331: (20) 1370-1371.

Kelly, J.V., PhD, Larned, F.S., MD, et al. Graduate Medical Education Consortia: Expectations and Experiences. *Academic Medicine.* 1994; 69: (12) 931-943.

Knickman, J.R., PhD, Lipkin, M., MD, et al. The Potential for Using Non-Physicians to Compensate for the Reduced Availability of Residents. *Academic Medicine.* 1992; 67: (7) 429-438.

Lave, J.R. The Cost of Graduate Medical Education in Outpatient Settings. In, Institute of Medicine. *Primary Care Physicians: Financing Their GME in Ambulatory Settings.* Washington, D.C.: National Academy Press, 1989.

Minnesota Department of Finance. Telephone interview. February 1, 1996.

Minnesota Department of Health. *A Summary of Practice Related Data, Minnesota Physicians, April 1993 - March 1994.* Minnesota Department of Health, St. Paul, MN. 1994.

Minnesota Department of Health. *Distribution of Insurance Coverage in Minnesota.* Issue Brief 95-07. Minnesota Department of Health, St. Paul, MN. October 1995.

Minnesota Department of Health. *Medical Education and Research Costs (MERC) In Minnesota's Reformed Health Care System: An Interim Report from the Commissioner of Health to the Legislature.* Minnesota Department of Health, St. Paul, MN. 1993.

Minnesota Department of Health. *Future Funding for Medical Education and Research in Minnesota: A Report to the Legislature and Recommendations for Continued Study.* Minnesota Department of Health, St. Paul, MN. 1994.

Minnesota Department of Trade and Economic Development. *Minnesota Medical Device Manufacturing: An Analysis of Industry Growth, Specializations and Location Factors.* Minnesota Department of Trade and Economic Development, St. Paul, MN. 1993.

Mullan, F., MD, Rivo, M.L., MD, et al. Doctors, Dollars, and Determination: Making Physician Work-Force Policy. *Health Affairs.* 1993; (Supplement) 138-151.

National Institutes of Health. *NIH Instruction and Information Memorandum OER 90-5. NIH Manual 4000 and 6000.* December 12, 1990.

New Zealand Ministry of Health. *Estimates of the Costs and Benefits of Clinical Training.* 1994.

Peters, W.P., Rogers, M.C. Variation in Approval by Insurance Companies of Coverage for Autologous Bone Marrow Transplantation for Breast Cancer. *New England Journal of Medicine.* 1993; 330(7):473-477.

Physician Payment Review Commission. Chapter 4: Reforming Graduate Medical Education. In: *1993 Annual Report to Congress.* Washington, D.C. Physician Payment Review Commission, 1993:55-85.

University of Minnesota School of Medicine, University of Minnesota Duluth School of Medicine. *1994 Annual Report: MinnesotaCare Primary Care Physician Training Initiatives.* University of Minnesota School of Medicine, Minneapolis, MN. 1995.

APPENDIX A
Medical Education and Research Cost (MERC) Legislation

Minnesota Statutes, Sec. 62J.045 of the 1993 MinnesotaCare Act:

MEDICAL EDUCATION AND RESEARCH COSTS

Subdivision 1. **Purpose.** The legislature finds that all health care stakeholders, as well as society at large, benefit from medical education and health care research. The legislature further finds that the cost of medical education and research should not be borne by a few hospitals or medical centers but should be fairly allocated across the health care system.

Subd. 2. **Definition.** For purposes of this section, "health care research" means research that is not subsidized from private grants, donations, or other outside research sources but is funded by patient out-of-pocket expenses or a third party payer and has been approved by an institutional review board certified by the United States Department of Health and Human Services.

Subd. 3. **Cost allocation for education and research.**

By January 1, 1994, the commissioner of health, in consultation with the health care commission and the health technology advisory committee, shall:

(1) develop mechanisms to gather data and to identify the annual cost of medical education and research conducted by hospitals, medical centers, or health maintenance organizations;

(2) determine a percentage of the annual rate of growth established under section 62J.04 to be allocated for the cost of education and research and develop a method to assess the percentage from each group purchaser;

(3) develop mechanisms to collect the assessment from group purchasers to be deposited in a separate education and research fund; and

(4) develop a method to allocate the education and research fund to specific health care providers.

APPENDIX A (Continued)

1994 Laws of Minnesota, Chapter 625, Article 5, Sec. 10:

CONTINUED STUDY OF MEDICAL EDUCATION AND RESEARCH COSTS.

Subdivision 1. **PURPOSE.** The legislature finds that health care research and the preparation of future health care practitioners are of great importance to the quality of health care available to the citizens of this state; that medical education and research must be designed to meet the health needs of the population and the changing needs of the health care delivery system; and that the cost of medical education and research should not place institutions engaged in these activities at a competitive disadvantage in the marketplace.

Subd. 2. **SCOPE OF STUDY.** The commissioner of health shall continue the study developed as part of Minnesota Statutes, section 62J.045, on the impact of state health care reform on the financing of medical education and research activities in the state. The study shall address issues related to the institutions engaged in these activities, including hospitals, medical centers, and health plan companies, and will report on the need for alternative funding mechanisms for medical education and research activities. The commissioner shall monitor ongoing public and private sector activities related to the study of the financing of medical education and research activities and include a description of these activities in the final report as applicable. The commissioner shall submit a report on the study findings, including recommendations on mechanisms to finance medical education and research activities, to the legislature by February 15, 1995.

Subd. 3. **RECOMMENDATIONS.** The study shall explore both private and public alternatives for funding medical education and research activities. The study shall include recommendations which, when implemented, would:

(1) help to assure the coordination between federal and state funding mechanisms;

(2) help assure adequate funding to support medical education and research activities;

(3) create alternative funding mechanisms, if necessary, to assure that medical education and research are responsive to the health needs of the population and the needs of Minnesota's health delivery system;

(4) help to assure that any changes in funding for medical education and health care research do not destabilize institutions that currently conduct, sponsor, or otherwise engage in health care research and medical education; and

(5) allocate the costs of medical education and research fairly across the health care system.

Subd. 4. **TASK FORCE.** The commissioner may appoint an advisory task force to provide expertise and advice on the study. The task force may include up to 20 members. The commissioner shall take under consideration representation of the following groups: the Minnesota association of public teaching hospitals and other nonteaching hospitals; private academic medical centers; the University of Minnesota medical school and its primary care residency programs; payer organizations including managed care, nonprofit health service plan organizations, and commercial carriers; other providers including the Minnesota medical association, the Minnesota nurses association, and others; a representative of the health technology advisory committee; employers; consumers; and medical researchers. The task force shall include representation of rural areas in the state.

1995 Laws of Minnesota, Chapter 625, Article 5, Sec. 10. (Only Subd. 2 amended.):
CONTINUED STUDY OF MEDICAL EDUCATION AND RESEARCH COSTS.

Subdivision 1. **PURPOSE.** The legislature finds that health care research and the preparation of future health care practitioners are of great importance to the quality of health care available to the citizens of this state; that medical education and research must be designed to meet the health needs of the population and the changing needs of the health care delivery system; and that the cost of medical education and research should not place institutions engaged in these activities at a competitive disadvantage in the marketplace.

Subd. 2. **SCOPE OF STUDY.** The commissioner of health shall the impact of state health care reform on the financing of medical education and research activities in the state. The study shall address issues related to the institutions engaged in these activities, including hospitals, medical centers, and health plan companies, and will report on the need for alternative funding mechanisms for medical education and research activities. The commissioner shall monitor ongoing public and private sector activities related to the study of the financing of medical education and research activities and include a description of these activities in the final report as applicable. The commissioner shall submit a report on the study findings, including recommendations on mechanisms to finance medical education and research activities, to the legislature by February 15, 1996.

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(4) help to assure that any changes in funding for medical education and health care research do not destabilize institutions that currently conduct, sponsor, or otherwise engage in health care research and medical education; and

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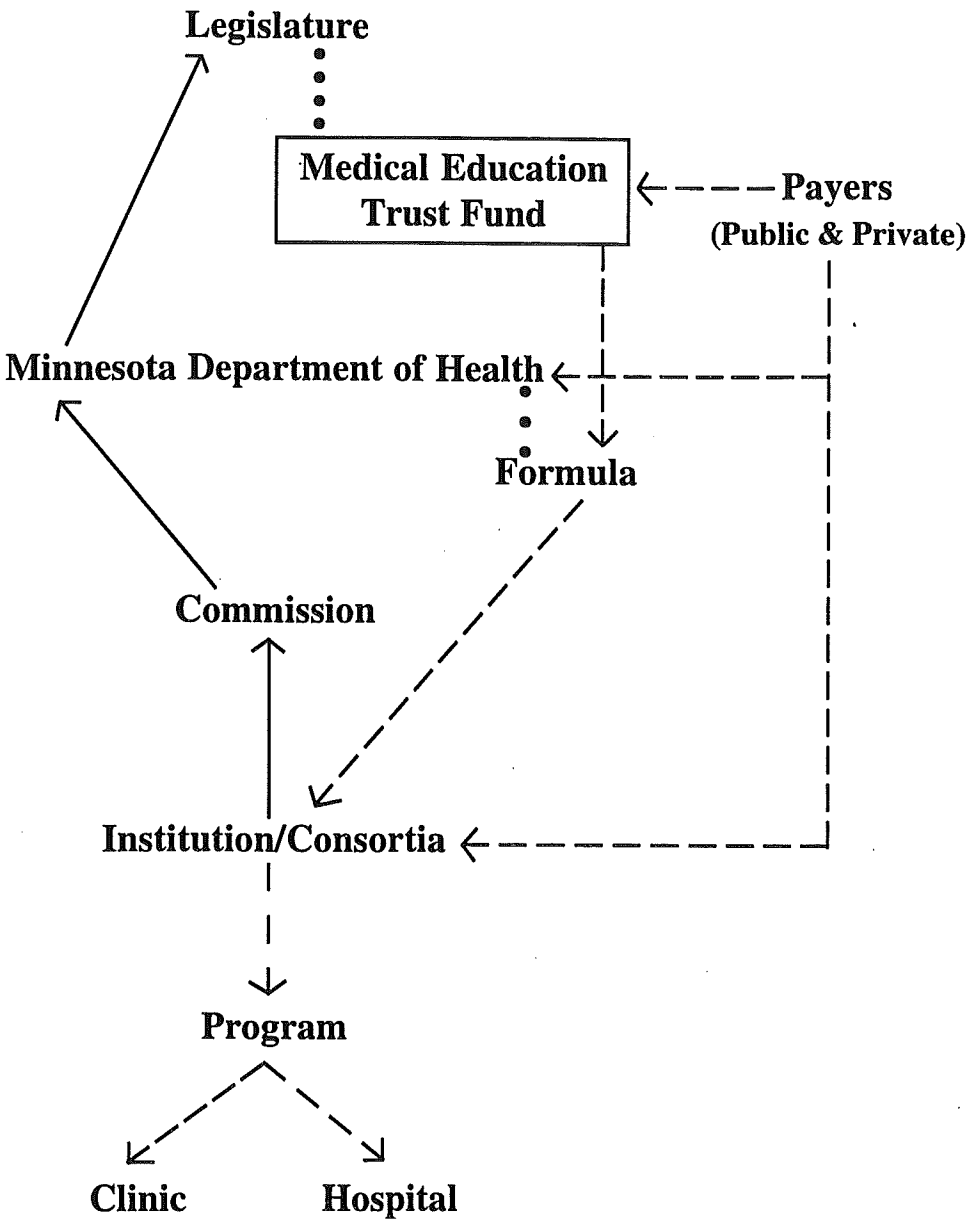
APPENDIX B
Medical Education Trust Fund Distribution Model



• • • represents administrative responsibility
— — represents flow of dollars
—— represents reporting process

APPENDIX C
Estimate of Benefits of Medical Education

The estimate of the benefits to Minnesota's teaching hospitals in 1993 of having medical residents is based on data from surveys of physicians and a relevant and representative academic study. The study, "The Potential for Using Non-physicians to Compensate for the Reduced Availability of Residents," (Knickman, et. al. 1992) estimates that a fully trained physician would be needed to perform at least 20 percent of a resident's activities if a resident were not available, while 35 percent of a resident's activities could be substituted for by mid-level practitioners.

Some members of the Financing Options Subcommittee felt that Minnesota teaching hospitals differ from the New York hospitals used in this study. Specifically, they felt that some Minnesota teaching hospitals were more likely to closely supervise their residents, and therefore the estimated percentage of activities that would need to be filled by a physician in the study was an overestimate for Minnesota. To account for these concerns, the benefits were estimated under the assumption that all residents trained in Minnesota are more closely supervised (10 percent of all residents time would need to be filled by a physician and 17.25 percent would need to be filled by a mid-level practitioner).

The next step in creating the estimate was to determine the appropriate salary levels for the relevant providers. According to the *1995 Minnesota Salary Survey,* produced by the Department of Economic Security, the average compensation for physicians and surgeons in Minnesota during 1994 was $125,195. The average compensation for physician's assistants was $41,309 during 1994. It was assumed that benefits for physicians and mid-level practitioners were equal to 20 percent of their salary.

Applying the assumptions from the study, the compensation estimates, and the benefit assumptions, resulted in an estimate of "benefit of trainees" of $47,500,000. This estimate changes, of course, depending on what assumptions are used to determine the salaries of physicans and mid-level practitioners, what level of benefits are assumed, the number of residents in the state, and most importantly, assumptions about how much of a resident's time would need to be filled by physicians and physician's assistants in the absence of residents.

APPENDIX D
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BIBLIOGRAPHY

AAMC. *Academic Medicine and Health Care Reform: Graduate Medical Education.* Association of American Medical Colleges, Washington, D.C. 1993.

AAMC. *Academic Medicine and Health Care Reform: Health-Related Research.* Association of American Medical Colleges, Washington, D.C. 1993.

AAMC (White, M.E.B.). *Medicare Budget Reconciliation: Comparison of House and Senate Proposals.* 1995.

Ad Hoc Task Force on Medical Education. *Minnesota Medical Association: Report of the Ad Hoc Task Force on Medical Education.* Minnesota Medical Association, 1995.

AHC Task Force on Health Care Delivery. *Financing Health Professions Education and Research Under Health Care Reform.* Association of Academic Health Centers, Washington, D.C. 1992.

Altman, D., Cohen, J.J. Problems and Promises: The Potential Impact of Graduate Medical Education Reform. *The Milbank Quarterly.* 1994; 72: (4) 719-723.

American College of Physicians Task Force on Physician Supply. Physician Assistants and Nurse Practitioners. *Annals of Internal Medicine.* 1994; 121: (9) 714-716.

American Medical Association. *Physician Characteristics and Distribution in the U.S.* American Medical Association. Chicago. 1993.

American Medical Association. *Transforming Medicare and Other Budget Proposals.* American Medical Association, 1995.

Anders, G. Costs Join Cadavers in the Medical School Curriculum. *The Wall Street Journal.* February 27, 1995. B1.

Anderson, G.F., PhD, Lave, J.R. Financing Graduate Medical Education and Biomedical Research: Whose Responsibility? *Health Policy.* 1987; 7: 3-12.

Anthony, C.R., PhD. Medicare Support of Medical Education. *Health Affairs.* 1988; Supplement: 158-162.

Arnstein, S.R., Haspel, L.U. A Perspective from Osteopathic Medical Schools. *The Milbank Quarterly.* 1994; 72: (4) 725-733.

Associated Press. Mass Closing of U.S. Medical Schools Urged. *Star Tribune.* November 17, 1995. A15.

Ayanian, J.Z. The Prospect of Sweeping Reform in Graduate Medical Education. *The Milbank Quarterly.* 1994; 72: (4) 705-712.

Bagley, G. Funding Cuts Creating Major Problems for Ontario's Clinical Teachers. *Canadian Medical Association Journal.* 1993; 149: (3) 331-333.

Barnett, P.G., Midtling, J.E., MD. Public Policy and the Supply of Primary Care Physicians. *JAMA.* 1989; 262: (20) 2864-2868.

Barrett, P.M. and Winslow, R. Justices Allow States' Overhaul of Health Care. *The Wall Street Journal.* April 27,1995.

Barzansky, B., PhD, Jonas, H.S., MD, et al. Educational Programs In US Medical Schools, 1994-1995. *JAMA.* 1995; 274: (9) 716-722.

Bazell, C., MD, MPH, Politzer, R.M., MS, ScD, et al. Health Care Reform and Primary Care: A Mandate for Graduate Medical Education Reform. *Journal of Family Practice.* 1994; 38: (5) 530-533.

Bednash, G., PhD., RN., Redman, B.K., PhD, RN., et al. Benefits and Costs to Clinical Service Agencies; Costs and Benefits to Academic Institutions. In: *The Economic Investment in Nursing Education: Student, Institutional, and Clinical Perspectives.* Lamothe, R., Washington, D.C.: American Association of Colleges of Nursing, 1992:97-117.

Bentley, J.D., PhD, Knapp, R.M., PhD, et al. Education in Ambulatory Care - Financing is One Piece of the Puzzle. *New England Journal of Medicine.* 1989; 320: (23) 1531-1534.

Billi, J.E., MD, Wise, C.G., PhD, MHA, et al. Potential Effects of Managed Care on Specialty Practice at a University Medical Center. *New England Journal of Medicine.* 1995; 333: (15) 979-983.

Black, N. Research, Audit, and Education. *British Medical Journal.* 1992; 304: 698-700.

Blumenthal, D., MD, Meyer, G.S., Maj.USAF. The Future of the Academic Medical Center Under Health Care Reform. *New England Journal of Medicine.* 1993; 329: (24) 1812-1814.

Bondurant, S. Health Care Reform Continues: Themes for Academic Medicine. *Academic Medicine.* 1995; 70: (2) 93-97.

Borger, J.Y. Medicare Will Pay For Test Devices: New Rule to Benefit Patients, Manufacturers. *Saint Paul Pioneer Press.* September 15, 1995. 1B & 2B.

Borzo, G. HMOs Value Research - If Others Pay For It. *American Medical News.* November 20, 1995. 1.

Brody, H., MD, Sparks, H.V., MD, et al. The Mammalian Medical Center for the 21st Century. *JAMA.* 1993; 270: (9) 1097-1100.

Brook, R.H., MD, ScD, Fink, A., PhD, et al. Educating Physicians and Treating Patients in the Ambulatory Setting: Where Are We Going and How Will We Know When We Arrive? *Annals of Internal Medicine.* 1987; 107: 392-398.

Buchanan, J.R., MD. Educational Impacts of New Care Systems. *Journal of Medical Education.* 1987; 62: 100-108.

Budetti, P.P., MD, JD. Achieving a Uniform Federal Primary Care Policy: Opportunities Presented by National Health Reform. *JAMA*. 1993; 269: (4) 498-501.

Bulger, R.J.M. The 'R' Word: 'Rationing' of Health Care and the Role of Academic Health Centers. *The Western Journal of Medicine*. 1992; 157: (2) 186-187.

Bureau of Health Professions (BHPr). *Health Personnel in the United States*. Eighth Report to Congress. Rockville, Maryland. 1991.

Burrow, G.N., MD. Tensions Within the Academic Health Center. *Academic Medicine*. 1993; 68: (8) 585-587.

Butler, R.N., MD. Education and Research: Key Components of Healthcare Reform. *Geriatrics*. 1992; 47: (11) 11-12.

Campbell, C.R., PhD, Gillespie, K.N., PhD, et al. The Effects of Residency Training Programs on the Financial Performance of Veterans Affairs Medical Centers. *Inquiry*. 1991; 28: 288-299.

CBO Study. *Medicare and Graduate Medical Education*. Congressional Budget Office, Washington, D.C. 1995.

CCH Pulse. Teaching Hospitals Want Equitable Cuts. *CCH Pulse*. 1995; 3: (21) 1-2.

CCH Pulse. GME Financing Reform Would Encourage Primary Care. *CCH Pulse*. 1995; 3: (14) 13.

CCH Pulse. Graduate Medical Education: Interim Trust Fund Proposed for Teaching Hospitals, Education. *CCH Pulse*. 1995; 3: (41) 7.

CCH Pulse. Republican Plans Feature Vouchers, More Cost-Sharing. *CCH Pulse*. 1995; 3: (30) 1 1, 9 & 10.

Center Watch. Can Academic Centers Remake Themselves? *Center Watch*. 1995; 2: (3) 1-9.

Chantler, C. Service Increment for Teaching and Research. *British Medical Journal*. 1992; 305: 71-72.

Christakis, N.A., MD, MPH, MA, Jacobs, J.A., PhD, et al. Change in Self-Definition from Specialist to Generalist in a National Sample of Physicians. *Annals of Internal Medicine*. 1994; 121: (9) 669-675.

Clack, G.B., Bevan, G., et al. King's Model for Allocating Service Increment for Teaching and Research (SIFTR). *British Medical Journal*. 1992; 305: 95-96.

Clymer, A. Clinton Offering Medical Centers A Compromise. *The New York Times*. March 22 1994. 1A.

Cohen, D.H., PhD. Observations from the AAMC Advisory Panel on Biomedical Research. *Academic Medicine*. 1991; 66: (10) 585-586.

Cohen, J.J., MD. Transforming the Size and Composition of the Physician Workforce to Meet the Demands of Health Care Reform. *New England Journal of Medicine*. 1993; 329: (24) 1810-1812.

Colloton, J.W. Academic Medicine's Changing Covenant With Society. *Academic Medicine*. 1989; 64: 55-60.

Colwill, J.M., MD. Financing Graduate Medical Education in Family Medicine. *Academic Medicine*. 1989; (March) 154-158.

Colwill, J.M., MD. Education of the Primary Physician: a Time for Reconsideration? *JAMA*. 1986; 255: (19) 2643-2644.

Committee of the Institute of Medicine, Division of Health Care Services. *Primary Care Physicians: Financing Their Graduate Medical Education in Ambulatory Settings*. National Academy Press, Washington, D.C. 1989.

Committee on Research. *Looking to the Future: Recommendations to Ensure Funding for Medical Research in the Climate of Cost Containment*. Medical Alley, St. Louis Park, MN. 1994.

Cooper, R.A. *Strategies to Achieve Balance in the Physician Workforce*. 1995 (unpublished work).

Cooper, R.A., MD. Perspectives on the Physician Workforce to the Year 2020. *JAMA*. 1995; 274: (19) 1534-1543.

Cooper, R.A., MD. Seeking a Balanced Physician Workforce for the 21st Century. *JAMA*. 1994; 272: (9) 680-686.

Council on Graduate Medical Education. *Seventh Report: COGME 1995 Physician Workforce Funding Recommendations for Department of Health and Human Services' Programs*. Council on Graduate Medical Education, Rockville, MD. 1995.

Council on Graduate Medical Education. *Fourth Report to Congress and the Department of Health and Human Services: Recommendations to Improve Access to Health Care Through Physician Workforce Reform*. Washington, D.C.: U.S. Dept. of Health and Human Services, 1994.

Creditor, M.C., MD. Medical Education and Health Care Reform. *The Pharos*. Fall, 1993; 2-5.

Culliton, B.J. Health Research Feels the Chill. *Nature*. 1993; 366: 200-202.

DeAngelis, C.D., MD. Nurse Practitioner Redux. *JAMA*. 1994; 271: (11) 868-871.

DeBakey, M.E. Medical Centers of Excellence and Health Reform. *Science*. 1993; 262: 523-528.

Delbanco, T.L., MD, Calkins, D.R., MD, MPP. The Costs and Financing of Ambulatory Medical Education. *Journal of General Internal Medicine*. 1988; 3: S34-S43.

Dobson, A., PhD, Coleman, K. *Analysis of Inpatient IME Costs in the State of Minnesota*. Lewin-VHI, Inc. Fairfax, VA. 1995.

Dobson, A., PhD, Coleman, K., et al. *Analysis of Teaching Hospital Costs*. Lewin-VHI, Inc. Fairfax, VA. 1994.

Dunham, N.C., PhD, Kindig, D.A., MD, PhD, et al. Wisconsin's Future Requirements for Generalist Physicians: Is the State's Training Capacity Sufficient? *Wisconsin Medical Journal.* January, 1995; 13-17.

Dunivin, D.L. Health Professions Education: The Shaping of a Discipline Through Federal Funding. *American Psychologist.* 1994; 49: (10) 868-878.

Ebert, R.H., MD, Ginzberg, E., MD. The Future of GME: Fine Tuning is Not Enough. In: *Taking Charge of Graduate Medical Education: To Meet the Nations Needs in the 21st Century.* New York: Josiah Macy Jr. Foundation, 1992:95-125.

Ebert, R.H.M. Has the Acute General Hospital Become an Inappropriate Environment for the Education of the Primary Care Physician? *Journal of Laboratory Clinical Medicine.* 1991; 117: (6) 438-442.

Educating More Primary Care Practitioners: A Building Block for Health Care Reform (Mawby, R.G., Grace, H.K.), et al. Educating More Primary Care Practitioners: A Building Block for Health Care Reform. 1993; 1-23 (abstract).

Eisenberg, J.M., MD. Financing Ambulatory Care Education in Internal Medicine. *Journal of General Internal Medicine.* 1990; 5: S70-S80.

Eisenberg, J.M., MD. How Can We Pay For Graduate Medical Education In Ambulatory Care? *New England Journal of Medicine.* 1989; 320: (23) 1525-1531.

Eisenberg, D.M., MD., Kessler, R.C., PhD, et al. Unconventional Medicine in the United States: Prevalence, Costs, and Patterns of Use. *New England Journal of Medicine.* 1994; 328: (4) 246-252.

Epstein, A.M., MD. US Teaching Hospitals in the Evolving Health Care System. *JAMA.* 1995; 273: (15) 1203-1207.

Evans, J.R., MD, DPhil. The "Health of the Public" Approach to Medical Education. *Academic Medicine.* 1992; 67: (11) 719-723.

Federman, D.D., MD. Medical Education in Outpatient Settings. *New England Journal of Medicine.* 1989; 320: (23) 1556-1557.

Feil, E.C., Welch, G., MD, et al. Why Estimates of Physician Supply and Requirements Disagree. *JAMA.* 1993; 269: (20) 2659-2663.

Fein, E.B. Medicare Plan May Curb Training of Doctors: Teaching Hospitals Are Heavily Subsidized. *Saint Paul Pioneer Press.* October 21, 1995. 1A & 5A.

Fein, E.B. Medical Schools Are Urged To Cut Admissions by 20%: Panel Sees an Oversupply and Inefficiency. *The New York Times.* November 17, 1995. D2.

Fletcher, R.H., MD, MSc, Moore, G.T., MD, MPH. The Physician Work Force: Does the Marketplace Set National Policy? *Annals of Internal Medicine.* 1994; 21: (9) 712-713.

Foley, J.K., MHA, Mulhausen, R.O., MD. The Cost of Complexity: The Teaching Hospital. *Hospital & Health Services Administration.* September/October 1986; 96-108.

Foreman, S., MD. The Changing Medical Care System: Some Implications for Medical Education. *Clinical Education of Medical Students.* 1995; 11-21.

Fox, P.D., Wasserman, J. Academic Medical Centers and Managed Care: Uneasy Partners. *Health Affairs.* 1993; Spring: 84-93.

Franks, P., MD, Nutting, P.A., MD, MSPH, et al. Health Care Reform, Primary Care, and the Need for Research. *JAMA.* 1993; 270: (12) 1449-1453.

Friedman, E. Whither Medical Education? A Sometimes Inflexible System Faces Change. *JAMA.* 1993; 270: (12) 1473-1476.

Friedman, E. Changing the Course of Things: Costs Enter Medical Education. *Hospitals, Journal of the American Hospital Association.* 1979; 82-85.

Fruen, M.A., Korper, S.P. Issues in Graduate Medical Education Financing. *Journal of Health Politics, Policy, and Law.* 1981; 6: (1) 87-97.

Fye, W.B., MD, MA. The Origin of the Full-time Faculty System: Implications for Clinical Research. *JAMA.* 1991; 265: (12) 1555-1562.

Ganem, J.L., CPA, Beran, R.L., PhD, et al. Review of US Medical School Finances, 1993-1994. *JAMA.* 1995; 274: (9) 723-730.

GAO. *Medical Education. Curriculum and Financing Strategies. Need to Encourage Primary Care Training.* Washington, D.C.: U.S. General Accounting Office, 1994:1-50.

Gesensway, D. Managed Care and Academia Join to Build 'Teaching HMOs'. *ACP Observer.* April 1995. 1, 14 & 15.

Gibbs Brown, J.G. (Inspector General) *A Study of Graduate Medical Education Costs.* Department of Health & Human Services, Washington, D.C. 1994:1-19.

Gillespie, K.N. *The Effect of Medical Education on Costs and Productivity in VAMC's.* Foundation for Health Services Research, Washington, D.C. 1994.

Ginzberg, E., Ostow, M., et al. *The Economics of Medical Education.* New York: Josiah Macy Jr. Foundation, 1993.

Ginzberg, E. Academic Health Centers. In: *The Medical Triangle, MDs, Politicians and the Public.* Cambridge, MA: Harvard University Press, 1990:57-77.

Ginzberg, E., MD. Caring for the Uninsured and Underinsured: Physician Supply Policies and Health Reform. *JAMA.* 1992; 268: (21) 3115-3118.

Ginzberg, E., PhD. The Reform of Medical Education: An Outsider's Reflections. *Academic Medicine.* 1993; 68: (7) 518-521.

Gold, M., Chu, K. *Financing of Academic Medical Centers and Graduate Medical Education Under Competitive Systems with Managed Care*. Washington, D.C.: Mathematica Policy Research, Inc., 1994.

Gold, M.R. HMOs and Managed Care. *Health Affairs*. 1991; Winter: 189-206.

Gottlieb, M. and Pear, R. Health Bill's Fine Print Hides Major Benefits for Industry. *Saint Paul Pioneer Press*. October 15, 1995. 1A & 8A.

Graham, J. Teaching and Research Hospitals: Task Force Calls for Reforms in Funding of Teaching Hospitals. *Modern Healthcare*. 1985; 93-94.

Greenfield, S., MD, Nelson, E.C., ScD, et al. Variations in Resource Utilization Among Medical Specialties and Systems of Care: Results from the Medical Outcomes Study. *JAMA*. 1992; 267: (12) 1624-1630.

Greer, D.S., MD, Petersdorf, R.G., MD, et al. What is Balance in the Physician Workforce? *JAMA*. 1995; 273: (12) 915-916.

Hadley, J. Teaching and Hospital Costs. *Journal of Health Economics*. 1983; 2: 75-79.

Haesler, W.K. Medical Education: A Role for Group Practice. *Group Practice Journal*. 1993; Nov./Dec., 32.

Hanft, R.S. Thoughts on Medical Education Reform. *Health Affairs*. Fall, 1988; 187-191.

Hayward, R.A., MD, Manning, W.G., PhD, et al. Do Attending or Resident Physician Practice Styles Account for Variations in Hospital Resource Use? *Medical Care*. 1994; 32: (8) 788-794.

Health Professions Report. *Demand For PAs to Grow, COGME-Commissioned Study Predicts; AMA Adopts New PA Guidelines*. Joel Whitaker, Fanwood, NJ. 1995.

Hein, J.W., DMD, PhD. The Role of Biomedical Research in Health Policy Formulation. *Journal of Dental Education*. 1980; 44: (9) 513-516.

Heyssel, R.M. Constrained Resources in Medical Education and Research. *Health Affairs*. 1984; 3: (4) 110-116.

Heyssel, R.M., MD. Beyond "Health Care Reform". *Academic Medicine*. 1993; 68: (3) 178-182.

Hosek, J.R., Palmer, A.R. Teaching and Hospital Costs: The Case of Radiology. *Journal of Health Economics* 2. 1983; 29-46.

Howatt, G. "U" Health Unit Seeking Cure: It Needs to Decide in Tandem With Regional System. *Star Tribune*. September 8, 1995. 1D.

Iglehart, J.K. Academic Medical Centers Enter the Market: The Case of Philadelphia. *New England Journal of Medicine*. 1995; 333: (15) 1019-1023.

Iglehart, J.K. Rapid Changes for Academic Medical Centers. (First of two parts.) *New England Journal of Medicine*. 1994; 331: (20) 1391-1395.

Iglehart, J.K. Rapid Changes for Academic Medical Centers. (Second of two parts.) *New England Journal of Medicine*. 1995; 332: (6) 407-412.

Iglehart, J.K. Health Care Reform and Graduate Medical Education. *New England Journal of Medicine*. 1994; 330: (16) 1167-1171.

Iglehart, J.K. The American Health Care System: Teaching Hospitals. *New England Journal of Medicine*. 1993; 329: (14) 1052-1056.

Iglehart, J.K. Difficult Times Ahead for Graduate Medical Education. *New England Journal of Medicine*. 1985; 312: (21) 1400-1404.

Institute of Medicine (IOM). *Primary Care Physicians: Financing Their GME in Ambulatory Settings*. Washington, D.C.: National Academy Press, 1989.

Integrated Healthcare Report. *Can Academic Medical Centers Survive?* Integrated Healthcare Report, Lake Arrowhead, CA. February, 1995.

Japsen, B. First Lady Asks AAMC for Support; Group Questions GME Financing. *Modern Healthcare*. November 15, 1993; 56.

Johnson, S.J., EdD, RN. GME Financing: A Well-Kept Secret. *Nursing Management*. 1994; 25: (4) 43-46.

Johnsson, J. Congress Moves to Get Medicare to Pay Fair Share for Research. *American Medical News*. June 19, 1995: 1, 9 & 10.

Jones, E.P., PhD, PA-C, Cawley, J.F., MPH, PA-C. Physician Assistants and Health System Reform: Clinical Capabilities, Practice Activities, and Potential Roles. *JAMA*. 1994; 271: (16) 1266-1272.

Jones, J.M., Matherlee, K.R. *Proposals to Reform the Physician Workforce: Tipping the Scale Toward Primary Care*. The George Washington University, Issue Brief 623, Washington, D.C.: 1993.

Jones, J.M, Matherlee, K.R. *Generalist Physicians in Managed Care Settings: A Different Twist on Physician Education and Primary Care*. George Washington University, Issue Brief No. 597, Washington, D.C.: 1992.

Josiah Macy Jr. Foundation. *1992 Annual Report*. Josiah Macy Jr. Foundation, New York, N.Y. 1992.

Josiah Macy Jr. Foundation. Recommendations and Consensus Issues. In: *Taking Charge of Graduate Medical Education: To Meet the Nations Needs in the 21st Century*. New York: Josiah Macy Jr. Foundation, 1992:35-40.

Journal of General Internal Medicine. Health Care Reform and Funding of Graduate Medical Education. *Journal of General Internal Medicine*. 1994; 9: (January) 55-57.

Kassirer, J.P. Access to Specialty Care. *New England Journal of Medicine.* 1994; 331: (17) 1151-1153.

Kassirer, J.P., MD. Academic Medical Centers Under Siege. *New England Journal of Medicine.* 1994; 331: (20) 1370-1371.

Kassirer, J.P., MD. What Role For Nurse Practitioners in Primary Care? *New England Journal of Medicine.* 1994; 330: (3) 204-205.

Kassirer, J.P., MD. Primary Care and the Affliction of Internal Medicine. *New England Journal of Medicine.* 1993; 328: (9) 648-651.

Kelly, J.V., PhD, Larned, F.S., MD, et al. Graduate Medical Education Consortia: Expectations and Experiences. *Academic Medicine.* 1994; 69: (12) 931-943.

Kindig, D.A., MD, PhD, Libby, D., PhD. How Will Graduate Medical Education Reform Affect Specialties and Geographic Areas? *JAMA.* 1994; 272: (1) 37-42.

Kirschner, M.W., Marincola, E., et al. The Role of Biomedical Research in Health Care Reform. *Science.* 1994; 266: 49-52.

Kirz, H.L.M., MBA, Larsen, C. Costs and Benefits of Medical Student Training to a Health Maintenance Organization. *JAMA.* 1986; 256: (6) 734-739.

Knapp, R.M., PhD, Butler, P.W., MHSA. Financing Graduate Medical Education. *New England Journal of Medicine.* 1979; 301: (14) 749-755.

Knickman, J.R., PhD, Lipkin, M., MD, et al. The Potential for Using Non-physicians to Compensate for the Reduced Availability of Residents. *Academic Medicine.* 1992; 67: (7) 429-438.

Kostreski, F. Pennsylvania Schools Focus on Internists: Coalition Gets Ready to Retrain Specialists. *Internal Medicine News.* November 15, 1995. 53.

Krakower, J.Y., PhD, Jolly, P., PhD, et al. US Medical School Finances. *JAMA.* 1993; 270: (9) 1085-1091.

Lamm, R.D. Medical Research: Alternative Views. *Science.* 1993; 262: 1497-1499.

Lapham, S.C., MD, Montgomery, K.A., BS, et al. HMO Databases: Fertile Ground for Epidemiological Research *Computers in Healthcare.* September, 1990; 18-24.

Lave, J.R. The Cost of Graduate Medical Education in Outpatient Settings. In, Institute of Medicine. *Primary Care Physicians: Financing Their GME in Ambulatory Settings.* Washington, D.C.: National Academy Press, 1989.

Light, D.W. Toward a New Sociology of Medical Education. *Journal of Health and Social Behavior.* 1988; 29: 307-322.

Livingston, N. U To Pare Programs In Budget Cuts: $32 Million Reduction to Shrink Faculty, Staff. *Saint Paul Pioneer Press.* October 10, 1995. 1A & 5A.

Livingston, N. U Plans to Cut 300 Jobs: Health Center Can't Afford to Pay All Residents' Salaries. *Saint Paul Pioneer Press.* September 9, 1995. 1B & 4B.

Livingston, N. U Health Center to Seek $50 Million From State. *Saint Paul Pioneer Press.* October 14, 1995. 1E & 2E.

Los Angeles Times. Inner-city Teaching Hospitals Already Taking It On The Chin. *Saint Paul Pioneer Press.* October 16, 1995. 10F.

Louwagie, P. Minnesota Health Care Bracing for Reductions: GOP Bid to Trim Budget is Cited. *Star Tribune.* September 3, 1995.

Majeski, J. and Borger, J.Y. In Fairview Deal, U Hospital Finds A Partner and A Future. *Saint Paul Pioneer Press.* November 17, 1995. 1A & 7A.

Majeski, T. U Program Gets $5 Million: Grant to Help Fund Cancer-Treatment Research. *Saint Paul Pioneer Press.* October 11, 1995. 1B & 4B.

Martini, C.J., MD, MPH, MSc. Graduate Medical Education in the Changing Environment of Medicine. *JAMA.* 1992; 268: (9) 1097-1105.

Marwick, C. New Panel Tackles Clinical Research Funding Cuts. *JAMA.* 1995; 274: (7) 526.

Matherlee, K.R. *The Outlook for Clinical Research: The Impacts of Federal Funding Restraint and Private Sector Reconfiguration.* The George Washington University, Issue Brief No. 671, Washington, D.C. 1995.

Matherlee, K.R. *Health Professions Training in Ambulatory Settings: Turning Talk into Action.* George Washington University, Issue Brief No. 658, Washington, D.C. 1994.

Matherlee, K.R. *Federal Support of Medical Education: Framing the Issues for the Systems Reform Debate.* George Washington University, Issue Brief No. 648, Washington, D.C.: 1994.

Matherlee, K.R., Jones, S. *Academic Health Centers: Victors or Victims of Health Systems Reform?* George Washington University, Issue Brief No. 640, Washington, D.C. 1993.

Meikle, J.T.H. (Josiah Macy Jr. Foundation) *Report of the Josiah Macy, Jr. Foundation: For July 1, 1993 through June 30, 1994.* Josiah Macy Jr. Foundation, New York. 1994.

Meyers, M. Deficit Cuts to Hurt At First: In the Short Haul, Few Americans or Businesses Will Emerge Unscathed. *Star Tribune.* June 12, 1995.

Minnesota Department of Health (MDH). *Anesthesia Practices Study.* Minnesota Department of Health, St. Paul, MN. 1995.

Minnesota Department of Health. *A Summary of Practice Related Data, Minnesota Physicians, April 1993 - March 1994.* Minnesota Department of Health, St. Paul, MN. 1994.

Minnesota Department of Health. *Distribution of Insurance Coverage in Minnesota.* Issue Brief 95-07. Minnesota Department of Health, St. Paul, MN. October 1995.

Minnesota Department of Health. *Medical Education and Research Costs (MERC) In Minnesota's Reformed Health Care System: An Interim Report from the Commissioner of Health to the Legislature.* Minnesota Department of Health, St. Paul, MN. 1993.

Minnesota Department of Health. *Future Funding for Medical Education and Research in Minnesota: A Report to the Legislature and Recommendations for Continued Study.* Minnesota Department of Health, St. Paul, MN. 1994.

Minnesota Department of Revenue. *1995 Minnesota Tax Incidence Study: Who Pays Minnesota's Household and Business Taxes?* Minnesota Department of Revenue, St. Paul, MN. 1995.

Minnesota Department of Trade and Economic Development. *Minnesota Medical Device Manufacturing: An Analysis of Industry Growth, Specializations and Location Factors.* Minnesota Department of Trade and Economic Development, St. Paul, MN. 1993.

Minnesota Taxpayers Association. *Minnesota State & Local Tax Revenue Overview, January, 1995.* Minnesota Taxpayers Association and Department of Revenue, St. Paul, MN. 1995. (unpublished work).

Mitka, M. Managed Care Blamed For End of Residency Program. *American Medical News.* August 22/29, 1994. 6.

Moore, G.T. HMOs and Medical Education: Fashioning A Marriage. *Health Affairs.* 1986; Spring: 148-153.

Moore, G.T., MD. Health Maintenance Organizations and Medical Education: Breaking the Barriers. Academic Medicine. 1990; 65: (7) 427-432.

Morris, Q.T., MD, Sirica, C.M. Proceedings. In: *Taking Charge of Graduate Medical Education: To Meet the Nations Needs in the 21st Century.* New York: Josiah Macy Jr. Foundation, 1992:11-33.

Mulhausen, R., MD, Kaemmerer, C., MSW, et al. Education Costs in Two Public Teaching Hospitals. *Academic Medicine.* 1989; 64: 314-319.

Mulhausen, R., MD, McGee, J., PhD. Physician Need: An Alternative Projection From a Study of Large, Prepaid Group Practices. *JAMA.* 1989; 261: (13) 1930-1934.

Mullan, F. Missing: A National Medical Manpower Policy. *The Milbank Quarterly.* 1992; 70: (2) 381-387.

Mullan, F., MD, Rivo, M.L., MD, et al. Doctors, Dollars, and Determination: Making Physician Work-Force Policy. *Health Affairs.* 1993; (Supplement) 138-151.

Mundinger, M.O., Dr.PH. Advanced-Practice Nursing - Good Medicine for Physicians? *New England Journal of Medicine.* 1994; 330: (3) 211-214.

National Academy Press. *Defining Primary Care: An Interim Report (IOM).* National Academy Press, Washington, D.C. 1994.

National Institutes of Health. *NIH Instruction and Information Memorandum OER 90-5. NIH Manual 4000 and 6000. December 12, 1990.*

New Zealand Ministry of Health. *Estimates of the Costs and Benefits of Clinical Training.* 1994.

O'Neil, E.H. *Health Professions Education for the Future: Schools in Service to the Nation.* Pew Health Professions Commission, San Francisco, CA. 1993.

Office of Technology Assessment. Summary and Policy Conclusions. In: *Health Technology Case Study 37. Nurse Practitioners, Physician Assistants, and Certified Nurse-Midwives: A Policy Analysis.* Washington, D.C. Office of Technology Assessment, 1986:3-14.

Page, L. Good News for Generalist Supply. *American Medical News.* April 3, 1995. 3 & 32.

Page, L. Can Medical Schools Influence Choice of Specialty? *American Medical News.* January 16, 1995. 8.

Peck, P. Top Internist Backs Selective GME Cuts. *Internal Medicine News.* 1995. 1 & 2.

Peinado, S.C., MD, Eisenberg, J.M., MD. Financing Graduate Medical Education in Primary Care: Options for Change. *The Journal of Family Practice.* 1990; 31: (6) 637-644.

Pereira-Ogan, G., MBA, Nash, D.B., MD. Putting a Price Tag on Training New Doctors. *Journal of American Health Policy.* 1994; Jan./Feb.: 19-25.

Peters, W.P., Rogers, M.C. Variation in Approval by Insurance Companies of Coverage for Autologous Bone Marrow transplantation for Breast Cancer. *New England Journal of Medicine.* 1993; 330(7):473-477.

Petersdorf, R.G., MD. It's Report Card Time Again. *Academic Medicine.* 1994; 69: (3) 171-179.

Petersdorf, R.G., MD. Medical Students and Primary Care: What Makes Specialties So Special. *JAMA.* 1994; 271: (12) 946-947.

Petersdorf, R.G., MD. Financing Medical Education: A Universal "Berry Plan" for Medical Students. *New England Journal of Medicine.* 1993; 328: (9) 651-654.

Petersdorf, R.G., MD. Graduate Medical Education: A Lesson in Non-governance. In: *Taking Charge of Graduate Medical Education: To Meet the Nations Needs in the 21st Century.* New York: Josiah Macy Jr. Foundation, 1992:181-204.

Petersdorf, R.G., MD. Three Easy Pieces. *Academic Medicine.* 1990; 65: (2) 73-77.

Pew Health Professions Commission. *Primary Care Workforce 2000: Federal Health Policy Strategies.* University of California, San Francisco: Center for the Health Professions, 1993.

Physician Payment Review Commission. *1995 Annual Report to Congress*. Physician Payment Review Commission, Washington, D.C. 1995.

Physician Payment Review Commission. Chapter 13: Graduate Medical Education Reform. In: *Physician Payment Review Commission Annual Report to Congress 1994*. Washington, D.C., Physician Payment Review Commission, 1994:237-263.

Physician Payment Review Commission. Chapter 4: Reforming Graduate Medical Education. In: *1993 Annual Report to Congress*. Washington, D.C. Physician Payment Review Commission, 1993:55-85.

Pories, W.J., MD, Smount, J.C., PhD, et al. US Health Care Reform: Will It Change Postgraduate Surgical Education? *World Journal of Surgery*. 1994; 18: (5) 745-752.

Reed, M.J., BDS, PhD. Some Practical Considerations for the Sponsorship of Postdoctoral General Dentistry Education Programs. *Journal of Dental Education*. 1987; 51: (6) 293-297.

Relman, A.S. Who Will Pay for Medical Education in Our Teaching Hospitals? *Science*. 1984; 226: 20-23.

Reuben, D.B., MD, Swanziger, J., PhD, et al. How Many Physicians Will Be Needed to Provide Medical Care for Older Persons? Physician Manpower Needs for the Twenty-First Century. *Journal of the American Geriatrics Society*. 1993; 41: (4) 444-453.

Rich, E.C., MD, Wartman, S.A., MD, PhD. Health Care Reform and Funding of Graduate Medical Education. *Journal of General Internal Medicine*. 1994; 9: (January) 55-57.

Rich, E.C., MD, Wilson, M., MD, et al. Preparing Generalist Physicians: The Organizational and Policy Context. *Journal of Internal Medicine*. 1994; 9: (1) S115-S122.

Rich, E.C., MD, Wartman, S.A., MD. Health Care Reform and Funding of Graduate Medical Education. *Journal of General Internal Medicine*. 1994; 9: 55-57.

Rich, S. and Pianin, E. Medicare Plan Passes House Panel. *Saint Paul Pioneer Press*. October 12, 1995. 2A.

Rivo, M.L., MD, MPH, Mays, H.L., MD, MPH, MBA, et al. Managed Health Care: Implications for the Physician Workforce and Medical Education. *JAMA*. 1995; 274: (9) 712-715.

Rivo, M.L., MD, Saultz, J.W., MD, et al. Defining the Generalist Physician's Training. *JAMA*. 1994; 271: (19) 1499-1504.

Rivo, M.L., MD, MPH, Satcher, D., MD, PhD. Improving Access to Health Care Through Physician Workforce Reform: Directions for the 21st Century. *JAMA*. 1993; 270: (9) 1074-1078.

Rivo, M.L., MD, MPH. Internal Medicine and the Journey to Medical Generalism. *Annals of Internal Medicine*. 1993; 119: (2) 146-152.

Rivo, M.L., MD, Jackson, D.M., MA, et al. Comparing Physician Workforce Reform Recommendations. *JAMA*. 1993; 270: (9) 1083-1084.

Rogers, M.C., MD, Snyderman, R., MD, et al. Cultural and Organizational Implications of Academic Managed-Care Networks. *New England Journal of Medicine*. 1994; 331: (20) 1374-1377.

Rosenblatt, R.A. and Chen, E. AMA Improves Chances for Revamping Medicare by Supporting GOP Plan. *Saint Paul Pioneer Press*. October 11, 1995. 1A.

Rosenblatt, R.A., MD, MPH. Specialists or Generalists: On Whom Should We Base the American Health Care System? *JAMA*. 1992; 267: (12) 1665-1666.

Rosenthal, E. Hospital Research Falling Victim to Lean Budgets. *The New York Times*. May 30, 1995. A1 & A12.

Rosenthal, E. Elite Hospitals in New York City Are Facing a Major Crunch. *The New York Times*. February 12, 1995.

Rosenthal, M.P., MD, Diamond, J.J., PhD, et al. Influence of Income, Hours Worked, and Loan Repayment on Medical Students' Decision to Pursue a Primary Care Career. *JAMA*. 1994; 271: (12) 914-917.

Sabatino, F. Health Reform and Primary Care: Physician Training Exposes Tensions in Field. *Hospitals*. 1992; 20-25.

Schaller, C., Dickler, R. Should HMOs Have Access to GME Funding? *Hospitals & Health Networks*. September 5, 1994; 5:68 (17) 8.

Schroeder, S.A., MD. The Latest Forecast: Managed Care Collides With Physician Supply. *JAMA*. 1994; 272: (3) 239-240.

Schroeder, S.A., MD. Training an Appropriate Mix of Physicians to Meet the Nation's Needs. *Academic Medicine*. 1993; 68: (2) 118-122.

Schroeder, S.A., MD, Sandy, L.G., MD. Specialty Distribution of U.S. Physicians - The Invisible Driver of Health Care Costs. *New England Journal of Medicine*. 1993; 328: (13) 961-963.

Schroeder, S.A., MD, Zones, J.S., PhD, et al. Academic Medicine as a Public Trust. *JAMA*. 1989; 262: (6) 803-812.

Schroeder, S.A., MD. Expanding the Site of Clinical Education: Moving Beyond the Hospital Walls. *Journal of General Internal Medicine*. 1988; 3: (Mar./Apr. Supplement) S5-S14.

Seifer, S.D., MD, Vranizan, K., MA, et al. Graduate Medical Education and Physician Practice Location: Implications for Physician Workforce Policy. *JAMA*. 1995; 274: (9) 685-691.

Sekscenski, E.S., MPH, Sansom, S., MPH, MPP, et al. State Practice Environments and the Supply of Physician Assistants, Nurse Practitioners, and Certified Nurse-Midwives. *New England Journal of Medicine*. 1994; 331: (19) 1266-1271.

Shapiro, M.F., MD, Larson, E.B., MD. Funding for Medical Care Research. *Journal of General Internal Medicine*. 1987; 2:(March/April) 113-118.

Showstack, J.A., MPH, Fein, O., MD, et al. Health of the Public: The Academic Response. *JAMA*. 1992; 267: (18) 2497-2502.

Shugars, D.A., O'Neil, E.H., et al. *Healthy America: Practitioners for 2005, An Agenda for Action for US Health Professional Schools*. The Pew Health Professions Commission, San Francisco, CA. 1991.

Shurin, S.B., MD, Miele, A., MD, et al. Problems in Primary Care. *New England Journal of Medicine*. 1993; 329: (10) 728-732.

Sloan, F.A., Feldman, R.D. Effects of Teaching on Hospital Costs. *Journal of Health Economics*. 1983; 2: 1-28.

Slovut, G. "U" Med School Training Cut Back: 350 Pared From Specialty Tracks. *Star Tribune*. September 9, 1995. 1B & 2B.

Slovut, G. Private Fairview Will Get Medical Clout; "U" Will Get Patient Referrals. *Star Tribune*. November 17, 1995. A1 & A14.

Solberg, C. Fairview Plans $20M North Corridor Site. *CityBusiness*. November 17-23, 1995. 4.

Solberg, C. U Talks With Allina About Partnership. *CityBusiness*. September 1-7, 1995. 1 & 25.

Solberg, C. U Hospital and Fairview Announce Plans to Merge. *CityBusiness*. November 17-23 1995. 1 & 43.

Sperry, R.J., MD, Ambati, B.K., et al. Cost of Teaching Medical Students. *JAMA*. 1995; 273: (10) 771-772.

Spiegel, J.S., MD, MSPH, Rubenstein, L.V., MD, MSPH, et al. Who is the Primary Physician?. *New England Journal of Medicine*. 1983; 308: (20) 1208-1212.

Star Tribune. "U" Hospital: Health Care World Demands Change. *Star Tribune*. September 10, 1995. 20A.

State Health Notes. Foreign-Trained Medical Grads: Does the US Need More or Fewer? *State Health Notes*. 1995; 16: (209) 4-5.

Steinwachs, R.M., PhD, Weiner, J.P., Dr.PH, et al. A Comparison of the Requirements for Primary Care Physicians in HMO's with Projections Made by the GMENAC. *New England Journal of Medicine*. 1986; 314: (4) 217-222.

Stoddard, J.J., MD, Kindig, D.A., MD, et al. Graduate Medical Education Reform: Service Provision Transition Costs. *JAMA*. 1994; 272: (1) 53-58.

Stoddart, G.L., PhD, Barer, M.L., PhD. Toward Integrated Medical Resource Policies for Canada: 5. The Roles and Funding of Academic Medical Centres. *Canadian Medical Association Journal*. 1992; 146: (11) 1919-1924.

Stout, H. and Rogers, D. GOP Plan to Cut the Deficit by Slashing Medicare Faces Political Risks as Most Voters Oppose Move. *The Wall Street Journal*. April 27, 1995. A14.

Stout, H. Search for Cures Gets Short Shrift in Health-Care Plans. *The Wall Street Journal*. April 1, 1994. 1B.

Straub, W.H., MD. *Physician Work Force Needs Under Managed Competition: Analysis and Proposed Model*. Jackson Hole Group, Teton Village, WY. 1993.

Stretnick, A.H., MD. Federal Funding of Primary vs Specialized Medical Education. *American Journal of Public Health*. 1994; 84: (1) 124.

Sullivan, L.W., MD. The U.S. Health Care System: Challenges for the Academic Health Professions Community. *Academic Medicine*. 1992; 67: (2) 65-67.

Task Force on Health Systems Reform and Medical Education, (American Medical Association Medical Education Group). Potential Impact of Health System Reform on Medical Education. *JAMA*. 1993; 270: (9) 1100-1101.

The Internist. Roger J. Bulger, MD: As the Practice of Medicine Changes, So Do Academic Health Centers. *The Internist*. 1995; April: 15-19.

Thier, S.O., MD. Academic Medicine's Choices in an Era of Reform. *Academic Medicine*. 1994; 69: (3) 185-189.

Thorpe, K.E. Why Are Urban Hospital Costs So High? The Relative Importance of Patient Source of Admission, Teaching, Competition, and Case Mix. *Health Services Research*. 1988; 22: (6) 821-836.

University of Minnesota School of Medicine, University of Minnesota Duluth School of Medicine. *1994 Annual Report: MinnesotaCare Primary Care Physician Training Initiatives*. University of Minnesota School of Medicine, Minneapolis, MN. 1995.

University of Minnesota School of Medicine. *Minnesota Care Primary Care Physician Training Initiatives: 1993 Annual Report*. University of Minnesota School of Medicine, Minneapolis, MN. 1994.

US Department of Health and Human Services. *Managed Care: Educating Medical Students and Residents in Primary Care and Preventative Medicine*. US Department of Health and Human Services, Rockville, MD. 1994.

US General Accounting Office. *Primary Care Physicians: Managing Supply in Canada, Germany, Sweden, and the United Kingdom*. US General Accounting Office, Washington, D.C. 1994.

US General Accounting Office. *Medical Education: Curriculum and Financing Strategies Need to Encourage Primary Care Training*. US General Accounting Office, Washington, D.C. 1994.

Vanselow, N.A., MD. Graduate Medical Education: Time for a Change. In: *Taking Charge of Graduate Medical Education: To Meet the Nations Needs in the 21st Century*. New York: Josiah Macy Jr. Foundation, 1992:127-149.

Verby, J.E., MD, Newell, J.P., MD, et al. Changing the Medical School Curriculum to Improve Patient Access to Primary Care. *JAMA*. 1991; 266: (1) 110-113.

Waihee, J., Grossman, J.H., et al. Hawaii's Message to the Nation. *Health Affairs*. 1993; Fall: 274-278.

Weeks, W.B., MD, Wallace, A.E., MD, et al. A Comparison of the Educational Costs and Incomes of Physicians and Other Professionals. *New England Journal of Medicine*. 1994; 330: (18) 1280-1286.

Weiner, J.P. The Demand for Physician Services in a Changing Health Care System: A Synthesis. *Medical Care Review*. 1993; 50: (4) 411-449.

Weiner, J.P., DrPH. Forecasting the Effects of Health Reform on US Physician Workforce Requirement: Evidence from HMO Staffing Patterns. *JAMA*. 1994; 272: (3) 222-230.

Weiner, J.P., DrPH., Steinwachs, D.M., PhD, et al. Nurse Practitioner and Physician Assistant Practices in Three HMO's: Implications for Future US Health Manpower Needs. *American Journal of Public Health*. 1986; 76: (5) 507-511.

Weissert, C.S., Knott, J.H. et al. *Health Professions Education Reform: Understanding and Explaining States' Policy Options*. Department of Political Science, The Institute for Public Policy and Social Research, Michigan State University, 1993.

Wennberg, J.E., MD, Goodman, D.C., MD, et al. Finding Equilibrium in U.S. Physician Supply. *Health Affairs*. Summer, 1993; 89-103.

Whitcomb, M.E., MD. A Cross-National Comparison of Generalist Physician Workforce Data: Evidence for US Supply Adequacy. *JAMA*. 1995; 274: (9) 692-695.

Whitcomb, M.E., MD, Miller, R.S., MS. Participation of International Medical Graduates in Graduate Medical Education and Hospital Care for the Poor. *JAMA*. 1995; 274: (9) 696-699.

Whitcomb, M.E., MD. The Role of Medical Schools in Graduate Medical Education. *JAMA*. 1994; 272: (9) 702-704.

Whitcomb, M.E., MD. *Physician Workforce Policy: Goals, Strategic Options, Implementation Issues, and Legislative Proposals*. The Ohio State University, Columbus. 1993.

Whitcomb, M.E., MD. The Organization and Financing of Graduate Medical Education in Canada. *JAMA*. 1992; 268: (9) 1106-1109.

Wieffering, E.J. The U of M Hospital and Clinic Has Stabilized Under CEO Greg Hart, but the Patient May Be Terminally Ill. *Corporate Report Minnesota*. 1994; 35-41.

Working Group on Medical Education and Health System Reform, Office of Medical Education, AMA. *The Potential Impact of Health System Reform on Medical Education*. Office of Medical Education, American Medical Association, Chicago. 1993.

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