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Caring for the Community: The Role of Partnerships

ABSTRACT

While many members of the public are deeply interested in and supportive of the three traditional missions of academic medicine—education, research, and clinical care, they also want to know what academic health centers (AHCs) are doing to improve the overall health of their communities. Much is already being done toward this goal, but improving communities' health in a measurable way requires a far broader agenda. AHCs must bring together the approaches of medicine and public health, and need to partner with many other players. This agenda must proceed despite all the other challenges that AHCs are currently facing.

The author reviews illustrative and emerging national, state, and local efforts, public and private, in both medicine and public health, in partnerships with individuals and institutions in the larger community. He also highlights the physician's role in assisting stakeholders' efforts to deal with health threats from the environment, and offers advice about how such efforts should proceed. He closes by emphasizing the importance of community-based research to learn about the health statuses, problems, and resources of particular communities, and presents a set of principles for such community-based research.

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"Caring for the community" is a part of the social contract between academic health centers and their local and regional communities. Many members of the public who are deeply interested in and supportive of the three traditional missions of academic health centers—education, research, and clinical care—also want to know what we who lead these centers are doing with our institutions' enormous assets in people, programs, facilities, and funds to raise the health status of the surrounding communities.

Much is already being done. The publication *Meeting the Needs of Communities*[1] and reports of several speakers at the 1998 Annual Meeting of the Association of American Medical Colleges describe admirable programs to improve the access of underserved populations and to raise the overall quality of health care in the extended communities the programs serve. But improving the health statuses of communities in a measurable way requires a far broader agenda for aca-demic health centers. To carry out that agenda, academic health centers must enlist partners.

For example, the concept of partnering is salient at the University of Michigan. Besides being a caring operation dedicated to the traditional missions, another explicit goal of the University of Michigan Health System is "to help create healthy communities in our region." The underlying values that every employee recognizes are written so that their first letters spell "partner":

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Patients and families first
Accountability for outcomes
Respect for individuals
Teamwork
Never-ending improvement
Empowerment
Responsibility for cost effectiveness

After 37 years, I vividly remember discussions from my first year at Harvard Medical School of this statement by Francis Weld Peabody: "One of the essential qualities of the clinician is interest in humanity, for the secret of the care of the patient is in caring for the patient."[2] As overriding as this quality is, it is only part of the picture. The patient is not an isolated individual; rather, the patient is part of a social fabric, however frayed, and a resident and a worker in specific communities. That realization is not a modern one. In his landmark 1910 report advocating laboratory-based scientific medicine, Abraham Flexner wrote that

> the physician's function is fast becoming social and preventative rather than individual and curative. . . . Disease has been found to depend largely on an unpropitious environment. . . . These conditions—a bad water supply, defective drainage, impure food, unfavorable occupational surroundings—are matters for social regulation, and doctors have the duty to promote social conditions that conduce physical well-being.[3]

Notice that Flexner called this opportunity and responsibility "the duty." Of course, he was not the first to think in this way. Hippocrates himself stated (as translated): "Pay attention to the environmental, social, and behavioral context in which illness occurs." What a clear forerunner of the current notion that we need to link medicine and public health! Indeed, the Greeks had named the daughters of Aesculapius Panacea and Hygiea, representing medicine and public health, respectively.

Another view of the complementary relationship of medicine and public health emerged in a conversation when I was dean of public health and community medicine at the University of Washington:

> University president, welcoming the dean of the school of medicine and the dean of the school of public health together: "Ah, my two health deans!"
>
> Medical school dean: "No, not really. He is the health dean, and I'm the sickness dean."

Nationally there are 125 allopathic medical schools but only 28 schools of public health. Those medical schools that have schools of public health as strong partners are better positioned for "caring for the community" in the way described here. Fortunately, new schools of public health are emerging in several states that until now had had none. For example, in 1998 David Satcher (then director of the Center for Disease Control and Prevention and now surgeon general) and I participated in ceremonies launching the School of Public Health at the University of Iowa. Medical centers and state health officers in Iowa will have a greater probability of finding a critical mass of very good public health scientists and practitioners within reach. Other health sciences schools should benefit, too.

THE CONTEXT

We all know that these are challenging times for academic health centers. The many threats to these centers' institutional health and values include:

- Reduced funding from governmental and private payers
- Need to assure patients' access to care and to improve the quality of care despite funding cuts
- Requirements to bear risk for cost and performance without sufficient adjustment for medical and social complexities
- Increased reporting and documentation burdens
- Theft of disproportionate-share and medical-education components of Medicare payments by some managed care companies, which use academic health centers as "contractors"
- Coexistence of discounted fee-for-service and capitation
- Patients' insistence on choice of physicians and plans
- Patients' unhappiness with gatekeepers' control of access to specialty care
- Need for investments in the academic mission

We must protect centers' educational, research, and community roles while competing effectively on new terms for the clinical business essential to maintaining and enhancing those roles. We must do so within the stark reality—even in these prosperous times for our nation—of major reductions in rates of payment from Medicare and Medicaid, as well as from employers who are aggressively focused on their own bottom lines as they compete in the global economy.

One of the most awkward challenges arises from the extended transition in which fee-for-service (no matter how discounted or disallowed) and capitation coexist. The incentives are completely inconsistent. Under fee-for-service, all justifiable and billable services are favored on an episode-by-episode basis without concern for total costs per month or for the patient's overall health status. Under capitation, physicians and health plans bear the financial risk of overspending on health care services, prevention is more likely to be emphasized, and patients fear being underserved. Get-

ting a decent, severity-adjusted payment level is often difficult in the numerous cases of "adverse selection": the sickest patients disproportionately choose or are sent to the academic health centers. The ideal is to practice the same high-quality, evidence-based, cost-effective medicine regardless of payment mechanism. The ideal is also to do all that is necessary to diagnose, treat, and rehabilitate patients while investing in keeping healthy those for whom—as individuals and as populations—we have responsibility.

Another challenge is the insistence by employers that health care providers both hold down costs and improve quality. They believe that poor quality, treatment errors, and inefficiencies drive up costs. They are keen about measuring academic health centers against other health care providers in terms of both cost and quality of care. For example, the Southeast Michigan Employer and Purchaser Coalition has compiled a hospital performance profile from public sources and responses of patients to surveys at all hospitals in the area. This profile includes ratings from Picker Institute surveys (on a three-star scale) of the following seven hospital characteristics: respect for patients, information and education, comfort and pain management, care coordination, emotional support, involvement of family and friends, and discharge preparation. The profile also presents data from analyses of outcomes and cost-per-case, somewhat severity-adjusted, for 15 medical, surgical, and childbirth conditions. The media eagerly publish these ratings and data, which also are made available on the Web.

This kind of public information gives hospitals and academic health centers in Michigan an external push for internal continuous improvement. Picker survey results triggered a dramatic improvement from 1996 to 1997 of the obstetrics services at the University of Michigan, for example. Clearly, the community is watching the academic health centers, measuring them, judging them on their performances and values against competitors and benchmarks. The community and its organizations want providers to be open with them and want to help them improve based on consumers' criteria for good care.

Another example of change, this time involving an entire academic health system, arose on my first day as head of the University of Michigan Health System in September 1997. Dr. Woodrow Myers, from the Ford Motor Company, was our speaker at medical grand rounds. After indicating his personal support for medical education and medical research, he made clear that his corporate responsibility was to assure good medical care for Ford employees, dependents, and retirees at the most competitive prices. He described academic health centers as simply too expensive—"likely to become dinosaurs." And, by the way, he said, "Where I work, you, my fellow physicians, would be known as. . . . vendors." The amphitheater was stone-silent! He did indicate that Ford valued and measured quality in its vendors and would pay a premium for demonstrably better quality. On behalf of the academic health center, I readily welcomed that challenge. Over the next several months, led by Dr. Jack Billi on our side, the University of Michigan Health System and the Ford Motor Company crafted a new health plan called Partnership Health.[4] We "turned the battleship" of the big academic health system to be responsive to their data-based sense of priorities and created a combination of proactive disease management for those with salient chronic health problems and attractive features for the generally healthy population.[4]

HEALTH PROMOTION; DISEASE AND INJURY PREVENTION

There is a nationally organized scheme for stimulating health care professionals and the larger community to improve the health of Americans. It began in 1979 with Surgeon General Julius Richmond and has been sustained through four presidential administrations; the current version is Healthy People 2000. Proposals for Healthy People 2010, presented in hearings around the country in the fall of 1998, have three overarching goals:

- Increase the span of healthy life.
- Reduce the health disparities among Americans, across all ethnic and racial groups.
- Achieve access to preventive services for all Americans.

These goals cannot be reached by conventional medicine alone. An article by McGinnis and Foege[5] presented a useful analysis. First, they showed the ten leading medical causes of 2,148,000 deaths in 1990, as reported on death certificates, ranging from heart disease (the no. 1 cause) to AIDS (no. 10). (See Table 1.) Then they listed nine lifestyle factors—from tobacco use (no. 1) to illicit drug use (no. 9)—that are estimated to have led to half these deaths (1,060,000). We might call these lifestyle factors the *real* causes of death, the preventable and reversible lifestyle factors that account for half of the deaths in the United States annually. For how many of such factors do those of us who are physicians want to be held responsible? At present, we basically chase the carnage—at high cost to the society. We need partners. The academic health centers in which many of us serve should find and assist those who have primary responsibility for dealing with these daunting, lifestyle-based health problems.

National Initiatives

During the last few years, the awareness of this need has led organized medicine and organized public health—with lead-

Table 1

Numbers of Deaths in the United States from the Ten Leading Causes, and Lifestyle Factors Leading to Half of These Deaths*

Cause on death certificate	
Heart disease	720,000
Cancer	505,000
Cerebrovascular disease	144,000
Accidents	92,000
Chronic pulmonary disease	87,0000
Pneumonia and influenza	80,000
Diabetes	48,000
Suicide	31,000
Liver disease, cirrhosis	26,500
AIDS	25,000
Total	2,148,000
Lifestyle factor, "the real cause"	
Tobacco use	400,000
Diet, sedentary lifestyle	300,000
Alcohol use	100,000
Infections	90,000
Toxic agents	60,000
Firearms	35,000
Sexual behaviors	30,000
Motor vehicle injuries	25,000
Illicit drug use	20,000
Total	1,060,000

*Data on causes of death from death certificates, 1990. Data on lifestyle factors based on McGinnis JM, Foege WH. Actual causes of death in the United States. from JAMA. 1993;270:2207–12.

ership from the academic wings of each—to start identifying a wealth of individual projects around the country that represent productive collaborations between these two complementary but long-separated health strategies. Dr. Roz Lasker, at the New York Academy of Medicine, has summarized the positive and complementary features of such collaborations:

- Improve health care by coordinating services for individuals
- Improve access to care for uninsured/underinsured
- Improve quality and cost-effectiveness of care with a population view
- Use clinical practice to identify and address community problems
- Strengthen health promotion and health protection
- Shape the future directions of the health system through collaborations in policy, training, and research[6]

The first three approaches represent ways that public health strategies can improve medical care. The remaining three approaches represent ways in which clinicians and health care organizations can help public health efforts improve the health of the communities in which they work and live and can develop synergies through community-based partnerships.

Among the programs that are fostering this kind of partnership are Healthy Cities and Healthy Communities programs, which are distributed worldwide. There are many local programs—but not enough in this large country. Healthy Communities 2000 produced the following model standards for enhancing the effects of public health efforts and those of related social and environmental agencies: emphasis on health outcomes, flexibility, focus upon the entire community, the government as residual guarantor, the importance of negotiation, use of standards and guidelines, accessibility of services, and emphasis on programs.

Another important effort is being made by the Centers for Disease Control and Prevention, which supports prevention centers, primarily at schools of public health. There are now 23 such centers, mostly engaged in community-based research and program development. A complementary, foundation-supported program called Health of the Public is active in some 33 academic health centers, based primarily in schools of medicine.

Meanwhile, in 1997 The Robert Wood Johnson Foundation and the W. K. Kellogg Foundation jointly created Turning Point: Collaborating for a New Century in Public Health, a program aimed at transforming public health practice and results through the development of broad community coalitions to make a difference. To succeed, these coalitions need medical organizations, environmental and agricultural interests, labor and management, and public officials working as partners. I urge those of you who are reading this article and who live in one of the 14 states* with the 41 funded community coalitions to explore the possibilities of participation if you are not already part of Turning Point.

* Alaska, Arizona, Illinois, Kansas, Louisiana, Montana, Nebraska, New Hampshire, New Mexico, New York, North Carolina, Oklahoma, Oregon, and Virginia.

Local Initiatives

Much can be done in addition to these externally funded initiatives. For example, the city–county health department in Salt Lake City, Utah, has mounted a public campaign to provide, at regular times each year, data on the community's health status, and to present some of these data in the form of stories on radio and television to dramatize health issues and problems. As a result, people in Salt Lake City are coming to expect data on a regular annual cycle about the community's overall health status, communicable disease outbreaks and risks, and environmental health indices (e.g., air

A TRIBUTE TO ROBERT G. PETERSDORF, MD

I presented this article originally as the 1998 Petersdorf Lecture at the 109th Annual Meeting of the Association of American Medical Colleges (AAMC). Because Bob Petersdorf has had a powerful and beneficial influence on my career, I am pleased to offer this tribute, which was part of the lecture.

Dr. Petersdorf was an imposing figure as the prematurely white-haired young successor to Robert Williams as chairman of the Department of Medicine at the University of Washington when I came to Seattle as a Fellow in medical genetics in 1969. He tolerated my research directions outside the mainstream of internal medicine, using molecular genetic techniques to explore the brain and human behavior, and then to investigate genetic–environmental interactions. In 1973 he plucked me from the junior ranks to organize the Robert Wood Johnson Foundation Clinical Scholars program proposal, under his guidance as principal investigator; he also gave his blessing in 1973 for my year as a White House Fellow at the Atomic Energy Commission. In 1977, when Dr. Frank Press offered me a position as deputy science adviser to President Carter, I asked the White House operator to find Dr. Petersdorf, who was in Dallas getting ready for his installation as president of the American College of Physicians. I sought his advice, and assured him that I would not go before doing my month of attending six weeks hence. He cut me off, told me he knew all about the recruitment, and said he would personally arrange a substitute or do the month's attending for me himself! There was no point in asking again whether he thought I should go off to Washington, D.C. He would periodically drop in to check on me and see what was going on in the Executive Offices—a forerunner of his own move to Washington several years later to head the AAMC.

The "Dorf," as his infectious diseases colleagues like Marvin Turck affectionately referred to him, came up the traditional academic path. With notable mentors, such as Lou Welt on his first paper in 1953 in the *Journal of Clinical Investigation*, and Ivan Bennett subsequently, his first 185 publications were all on infectious diseases. By 1971 he had begun writing about policy aspects of medical care, medical education, and medical research. He wrote in *The Pharos* of Alpha Omega Alpha that "amidst all the brouhaha of the health care crisis, academic medicine may get squashed between the idealism of the students and the pragmatic cynicism of the politicians." He even called for a curriculum that presents the genetic code repeatedly and in multiple contexts throughout the four years of medical school. That was in 1972; how prescient!

After initial skepticism, he caught the wave of primary care and became a remarkable proponent nationally. He spawned a whole new set of protégés in general internal medicine. In 1978 he described the "family medicine imperative," broadened it to include general internal medicine and general pediatrics, and declared that medical schools with a culture that encourages generalism will breed more generalists and better serve the nation's needs. In the early 1990s he and his AAMC colleagues mounted *Project 3000 by 2000*, trying to double the stagnant national numbers of medical students from disadvantaged minority backgrounds, an ongoing priority.

Through all of his leadership positions, he has been a steadfast champion, as well as a very constructive critic, of academic medicine. He has been an inspiration to me, my generation, and many others.

—GILBERT S. OMENN, MD, PhD

and water quality, restaurant closings, youth violence, motor vehicle deaths, childhood lead poisoning, seat-belt use, and hazardous waste disposal). The way the stories are told to bring the data to life is as important as the data: conflict, mystery, celebrities, sensation, deviance, tragedy, and proximity are elements used to make the stories vivid and interesting. The Salt Lake City effort convinces me that the media can be persuaded to create "hooks" for health stories and to make the adoption of healthful behaviors a positive message rather than a litany of "don'ts" that people tend to ignore or resent.

In 1994 at the University of Washington School of Public Health and Community Medicine, the faculty developed an annual report called *The State of Washington's Children*, using health, social, and economic indicators. One clever way to "package" this information was with a "tip of the iceberg" theme. Here is an example from that report:

In 1996 among Washington's 55 million residents,

- 15 children died from abuse and neglect, while there were 85,000 reports of child abuse and neglect;
- 50 children died by suicide, but 11,000 children were reported to have made a suicide attempt with injury;
- 95 children died of gunshot wounds, yet 11,000 children carried a gun.

Such startling facts supply excellent material for the op-ed editors and serve to motivate the public and the legislature.

Another effort that uses public information about health risks and access problems to focus service has been organized by the University of Michigan Health System. This multifaceted community outreach program, similar to those at many other medical schools, and elsewhere, includes Galen Society (student-led child health) programs; free clinics for the homeless, low-income children, and migrant farm workers; the Michigan Interactive Health Kiosk Project (for lifestyle behavior change); the Washtenaw Integrated Medicaid Project (linking mental health and regular health services for Medicaid populations); Healthplace 101 (school-based services); health ministries (training church members as wellness leaders); the Corner Health Center (a health center for low-income teens and children); Health Occupations Partners in Education (HOPE) (community partnerships with Ypsilanti schools and churches to prepare students for health careers); Fox 2 television "Healthy Lifestyles" series; Health Night Out (adult education programs); M-Fit programs (for planning healthy diets and learning to interpret grocery-store shelf labels); and the Turner Senior Resource Center (continued learning, a housing bureau for seniors, and "Fitness over Fifty" programs). A large proportion of our University of Michigan medical students choose to participate in these programs, along with faculty and staff.

The University of Michigan Hospitals and Medical School have put major emphasis on these activities by highlighting community service by our employees and by encouraging many others to follow suit. I believe that these opportunities for individual and group community service—along with many other related obligations and opportunities—are important components of our students' education.

Nevertheless, despite a favorable distribution of income and education and ample medical and public health expertise, my new state of Michigan has an embarrassing health-risk profile: seventh worst state in the nation in prevalence of smokers; eighth worst in prevalence of overweight persons (with 1.5 times the national average of overweight adolescents); and above average in mortality from heart disease, cancers, and diabetes. No wonder costs for medical care are high. Programs at medical schools are not enough to change these statistics and to lower costs: employers, employees, community organizations, and the media need to help, too, so that the health-risk profiles of all groups in the population can be improved. The kinds of broad coalitions organized by Turning Point (see above) are needed everywhere.

Thus, we turned our attention to the Washtenaw County [Michigan] Health Improvement Plan: Priorities for the Year 2005, built on the principles and databases of Healthy People 2000 (above) with these components:

- Healthy Kids—focusing on chronic and communicable diseases; perinatal health; birth rates of children of teens; child abuse and neglect; and alcohol, tobacco, and illicit drug use
- Healthy Adults—focusing on chronic diseases; alcohol and other drug use; infectious diseases; and access to good medical and dental care
- Healthy Environment—focusing on critical environmental pollutants; environmental quality; and adverse effects of environmental hazards
- Healthy Communities—focusing on rates of intentional injuries; and alcohol and other drug use

This excellent plan needed a boost toward implementation. So in 1998, the University of Michigan Health System joined with its local competitor, the St. Joseph Mercy Health System, and the Washtenaw County Department of Public Health to create an action-oriented coalition with initial foci on infant health; childhood immunizations; abuse, neglect, and violence; access to care; and building broad coalitions to actively support local health-improvement initiatives. However much we at academic health centers may compete in certain clinical care areas, we have a public trust to help the community as a whole. We might as

well cooperate to stretch our resources and send a positive message to the community.

ENVIRONMENTAL HEALTH AND RISK ASSESSMENT

Environmental health is pretty far outside the direct responsibility of most physicians. It is even outside the direct responsibility of many state and local health departments, which have ceded responsibility in that area to the state equivalents of the Environmental Protection Agency (EPA): state environmental agencies, regional air and water quality agencies, and the like. Yet it is to physicians that patients and others in the community turn when they are perplexed or anxious about environmental pollutants and current or potential exposures.

From 1994 to 1997, I had the opportunity to chair the Presidential/Congressional Commission on Risk Assessment and Risk Management for all of the federal environmental, health, and safety agencies. Our reports[7] drew a lot of public policy attention because we proposed a fresh way to think about the plethora of environmental, health, and ecological problems:

- Put each problem into a public health context before starting the wheels grinding on technical analyses of likely or worst-case risks.
- Engage community stakeholders from the very beginning in defining the problems, specifying the significant questions, unearthing relevant information (especially about sources and patterns of exposure), and then evaluating and explaining the findings and recommendations.

Physicians can have a key role in such stakeholders' efforts, especially if they have enough understanding of epidemiology, toxicology, and differential diagnosis to provide expertise and good judgment.[8]

The key to combating public health problems more effectively, specifically those problems dealing with environmental factors, is to create context. We physicians and others who are trying to meet the challenge must move beyond consideration of one chemical at a time or one isolated adverse health effect from water, air, food, or products. For each particular chemical or other environmental agent we can and should specify multiple sources, multiple media (e.g., air, water, food), multiple agents that have similar effects, and multiple risks from the same chemical or agent—and we must take into account social, cultural, and environmental justice considerations. Furthermore, we should learn to talk in plain language and not confuse ourselves and those with whom we are trying to communicate in the community with overly technical jargon and mathematical modeling of uncertainties utilized by the EPA to achieve credibility with experts. Most of all, we must remember that communicating must be two-way: listening as well as telling.

COMMUNITY-BASED RESEARCH

Let me conclude my comments on caring for the community by (1) emphasizing the importance of community-based research—that is, research to learn about the health statuses, issues, and problems of particular communities—and (2) stating the following set of principles for such research, developed at the University of Washington's Harborview Medical Center under the leadership of James LoGerfo, MD, another protégé of Robert Petersdorf (who is described in the boxed text on page 786):

- Community partners should be involved with professional health researchers from the earliest stages of research efforts.
- Community partners should have real influence on the research project.
- Research processes and outcomes should benefit the community—sooner rather than later.
- Community members should be part of the analysis and interpretation of results.
- Productive partnerships should last beyond the individual project.
- Community members should be empowered to initiate projects, hopefully seeking out physicians and other health experts to be their partners.

There are stresses in implementing these principles—finding the most appropriate partners, making adjustments as the project is defined, realizing after getting everyone geared up for the project that funding may not be obtainable, finding ways to treat the comparison or placebo group as soon as a research intervention is completed and the findings have undergone preliminary analysis, and trying to hire local people with appropriate skills and/or potential. But these stresses must be faced, because having partnerships is a powerful way to build credible and useful community-based research, as well as support for the traditional missions of academic health centers.

Such research partnerships, combined with better education and clinical care, can measurably improve the health of the communities that we in academic medicine serve. I am confident that we can rise to the challenges that these activities present. In doing so, we will better fulfill academic medicine's social contract.

REFERENCES

1. Meeting the Needs of Communities: How Medical Schools and Teaching Hospitals Ensure Access to Clinical Services. Washington, DC: Center for the Assessment and Management of Change in Academic Medicine, Association of American Medical Colleges, 1998.
2. Peabody FW. Care of the patient. JAMA. 1927;88:877–82.
3. Flexner A. Medical Education in the United States and Canada. A Report to the Carnegie Foundation for the Advancement of Teaching. Bulletin No. 4. Boston, MA: Updyke, 1910.
4. Billi J. University of Michigan Health System and Ford unite to offer a new product. Acad Clin Pract. 1998;11:6–9.
5. McGinnis JM, Foege WH. Actual causes of death in the United States. JAMA. 1993;270:2207–12.
6. Lasker RD, Abramson DM, Freedman GR. Pocket Guide to Cases of Medicine and Public Health Collaboration. New York: New York Academy of Medicine, 1998.
7. Presidential/Congressional Commission on Risk Assessment and Risk Management. A Framework for Environmental Health Risk Management; Final Report. Washington, DC: Government Printing Office, 1997; <www.riskworld.com>, accessed April 20, 1999.
8. Omenn GS. Putting environmental risks in a public health context. Public Health Rep. 1996; 111:514–6.