Characteristics of Research Centers and Institutes at U.S. Medical Schools and Universities

William T. Mallon, Ed.D., and Sarah A. Bunton, Ph.D.

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Executive Summary

Many observers underscore the ineluctable movement toward interdisciplinarity in biomedical research. Organized research units—that is, centers and institutes—are a common mechanism for organizing interdisciplinary scientific work in universities and medical schools. Little is known, however, about what constitutes research centers and institutes. What do we talk about when we talk about centers?

In 2003, the Association of American Medical Colleges (AAMC) launched a research project designed to explore the role of interdisciplinary centers and institutes within the larger structure of biomedical research and academic medicine. Among the project’s salient questions were: What are centers or institutes? How do they work? What relationships do these units have with academic departments? How do faculty manage the potentially competing allegiances of departments and centers? How is institutional governance exercised in this milieu? What are the organizational and management implications of these units for faculty and academic leaders?

The initial phase of the AAMC initiative involved exploring the characteristics and status of biomedical and health-related research centers and institutes in research-intensive universities. In this report, we present the results of a 2004 survey of directors of centers and institutes. The findings provide descriptive information about the mission, activities, organizational structure, funding sources, size, staffing, and governance relationships of these organized academic units, which have emerged as an integral part of the landscape of biomedical research in the 21st century. Several intriguing findings emerge from this research:

- **What Do Centers Do?** The mission and role of centers are highly varied, complex, and nuanced. While many assertions have been made about the functions that centers perform in academic settings, we found that centers do not exist solely to conduct research. Instead, they also contribute in many important ways to the educational mission of universities, including instruction and training of undergraduates and graduate students, medical students, residents, and fellows. In addition to education, many research centers are also involved in activities such as patient care and service and outreach. However, research centers have not made patenting and technology transfer a high priority relative to other activities. These numerous roles and functions of research centers serve an important purpose by adding to the richness of the university, providing service to individuals and the community, and conducting research that can increase the reputation and strength of the university and medical school.

Do research centers structure their work in an interdisciplinary manner? Biomedical and health-related research centers show substantially more interdisciplinary approaches to their work than similar centers in a previous era.
Centers today also involve investigators from a greater variety of departments than centers included in past studies. These results suggest that research centers are responding to the demands of science for collaboration and interaction among researchers from many fields and that centers may offer faculty members opportunities for interdisciplinary activities not available in the traditional disciplinary-based departmental structure.

Furthermore, newer research centers in both basic and clinical fields embrace more collaborative, less unidisciplinary approaches to research than do older centers, supporting the idea of a trend toward interdisciplinarity.

**What Resources Do Research Centers Have?** The majority of centers have limited staff, space, and funding. Although exceptions certainly exist, most centers do not have the status and authority of departments. Centers and institutes sometimes have been criticized for draining resources from departments. Our results indicate that centers receive most of their funding from sources outside the university, do not control faculty appointments, and contribute little to faculty salaries. In most cases, academic departments are maintaining their primacy in the work life of faculty members. A select group of “Power Centers” defies this general trend. Power Centers report directly to major academic decision makers (for example, the university president or provost) and have considerably larger staffs and financial resources than do other centers.

Centers and institutes receive most of their financial resources from government sources (63 percent, on average), followed by university funds (13 percent). Centers derive scant funding from industry and corporations. While most centers and institutes have assigned space, physical space may not be, in and of itself, a good indicator of size or status. The “virtual” centers in the study do not differ from centers with space in terms of staffing, faculty affiliations, or reporting relationships.

Over 40 percent of centers have one or more faculty members with appointments in university divisions outside the medical school; 12 percent have one or more faculty with appointments in other universities. These findings indicate that centers can facilitate interaction among researchers from different disciplines, schools, and even institutions to cross traditional boundaries and work on problems of mutual interest.

**Are Centers Held Accountable?** While some argue that centers often are not held sufficiently accountable for meeting their goals and objectives, our results indicate that research centers typically are subject to accountability measures. Almost four-fifths of the centers in the study are subject to periodic program review, and three-quarters have at least one advisory committee in place.

These findings suggest a number of implications for university and medical school faculty and administrators:

1. Research centers are important and integral mechanisms for supporting, sustaining, and growing the biomedical research enterprise.

2. Most research centers remain on the margins of institutional power, prestige, and influence. In general, departments continue to hold primacy over centers.

3. While most centers are subject to program review, universities may consider the use of term limits as an added measure of accountability.

4. Universities should consider defining more precisely the many diverse entities called “centers” and “institutes” to avoid the confusion that arises when these many disparate units are grouped together.
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Introduction

In what has been called the Century of Biology (Kafatos & Eisner, 2004), recent decades have seen a rapid and profound expansion of knowledge in the life sciences. Researchers have made important advancements and discoveries—in molecular biology, immunology, genomics, proteomics, bioinformatics, and neuroscience, to name a few—contributing to the basic understanding of life and the subsequent application to new cures for disease and prevention of human suffering.

Biomedical research has grown more quantitative, more complex, and more interdisciplinary. In this milieu, investigators do not function solely within the confines of traditional biomedical disciplines. Many research efforts require experts from mathematics, computer science, engineering, chemistry, physics, psychology, anthropology, and others. Promising avenues of basic research and clinical application require greater links among and beyond disciplines and across institutions (Cowell, 2002; European Union Research Advisory Board, 2004; Institute of Medicine, 2004; Ludmerer, 1999; National Academy of Science, 2004; Powell & Owen-Smith, 2002).

Such proclamations are not without impact on the structure and function of the academy. Historically, discipline-based academic departments served as gatekeepers of the faculty, generators of research, and guardians of the curriculum. But as science continues to outgrow the epistemological borders that the university has placed around it, academic institutions are transcending departments and schools to conduct and train for scientific and medical research. As a result, collaborative efforts within the medical school and throughout the university make the once-rigid boundaries between departments, schools, and institutions more permeable and fluid. In some medical schools, for example, traditional basic science departments have been restructured. Some schools have developed new departments, such as neuroscience and genetics; others have closed, consolidated, or merged existing ones (Mallon, Biebuyck & Jones, 2003).

In other cases, many of the nation’s largest and most prestigious universities have created interdisciplinary research centers and institutes. These centers and institutes capitalize on the interstices of “Big Biology”—not only to assemble researchers with diverse skills and expertise, but also to build and solidify institutional prestige, tap new and existing sources of funding, and serve as engines of economic development. In certain cases, interdisciplinary centers and institutes are moving from the margins toward the mainstream of the university—with control over space and funding and influence over faculty recruitment. These developments have led faculty and chairs to worry about a loss of departmental integrity, power, and funding (Fischman, 1998; Galbreath, 2004; Ibrahim et al., 2003). While the roles of interdisciplinary centers and institutes in research universities and medical schools have been discussed anecdotally, these organizational units have received scant systematic attention in recent years, especially surprising given the vast amount of research that takes place under their auspices.

Study Design

In 2003, the Association of American Medical Colleges (AAMC) began a research project to explore the role that interdisciplinary centers and institutes have within the larger structure of biomedical research and academic medicine. Questions driving this project included: What are centers and institutes? How do they work (that is, what are their forms and functions)? What relationship do centers and institutes have with academic departments? How do faculty—especially junior faculty—interact with the potentially competing allegiances of departments and centers? How is institutional governance and decision-making exercised in this milieu? And what are the organizational and management implications of these units for faculty and academic leaders? Given that there was no reliable or complete data source for answering the first two questions—what is a center and how does it work and function?—we designed the initial phase of the AAMC initiative to explore the characteristics and status of biomedical and health-related centers and institutes.

The purpose of this survey research was to determine the size, scope, and range of activities at centers and institutes affiliated with research-intensive medical schools and their parent universities in the United States.

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1 See Appendix A for a complete project description.
In this report, we will use the terms “center” and “institute” interchangeably to refer to nondepartmental organizational units of the medical school or university. We focused primarily on entities that organize, facilitate, or conduct basic and applied research.

We were less interested in centers that perform educational, clinical, or outreach functions, and we were not interested in service facilities (e.g., libraries, computer laboratories, and instrumentation facilities that solely offer support services for researchers).

Specifically, we wanted to answer the following research questions:

• What are the organizational characteristics of centers, such as primary mission, sources and amounts of funding, size and scope of faculty and research staff, space, frequency of evaluation, and director’s role and reporting relationships?

• In what ways do centers differ from each other in organizational complexity, as measured by financing, personnel, space, evaluation, and director’s reporting relationships?

See Appendix B for a discussion of research methods.

Are “Centers” Different From “Institutes”?

Should we make distinctions between entities called “centers” and those called “institutes”? Some schools designate differences in institutional policies. Penn State University College of Medicine, for example, stipulates that an institute incorporates all core missions (patient care, research, teaching, and community outreach), while a center includes only two of those four missions; institutes may involve more than one university, while centers must be contained within a school; and faculty can have primary appointments in institutes but not in centers. Several other universities and medical schools have similar policies but they tend to be the exception, not the rule. Most universities have not articulated policies identifying differences in terminology.

Data from our survey suggest, however, that institutes are different from centers in several key ways. Institutes have, on average, more funding and more assigned space than centers. Additionally, they are more likely than centers to report to a higher level in the academic hierarchy (to the provost, for example, rather than a department chair). The two types, however, are not statistically different in several important parameters such as number of faculty affiliates or size of overall staff.

These differences suggest that, while schools may not have policies that govern the nomenclature of these entities, in practice, “institutes” may have more resources than “centers.”

2 These units may have other names: programs, projects, laboratories, and clinics, to name a few.
Context

Centers and institutes have always been controversial in American university settings. Some observers excoriate their form as marginal to the mission of the university—an unwanted distraction from core activities. The great higher education reformer Abraham Flexner was perhaps the earliest critic of these organizational add-ons. In 1930 he wrote:

What is an “institute”? The word was taken over from German nomenclature where it means a laboratory or a group of laboratories. In American it may mean something or nothing. At the University of Chicago, the Oriental Institute denotes a group of instructors who deal with oriental subjects. The “institute” has no other existence—it is not a group detached from the faculty, it has no autonomy, it is merely a number of persons or departments, supported, like others, partially out of general funds, partially by special funds held by the university for their use. Harvard has in its faculty of law an Institute of Criminal Law, which would appear to be simply the name for the research activities of the chair devoted to that subject—a dubious departure, since it implies a possible separation of teaching and research with the limits of a university chair. (Flexner, 1930, pp. 110-111)

The criticism has never disappeared. Rossi (1964) noted that through unplanned and adaptive growth, the university created a “periphery occupied by institutes and centers… vaguely defined and discontinuous” (p. 1142). But proponents argue that the proliferation of centers and institutes testifies to their great strengths—that by focusing on particular research activities and being responsive to societal needs and interests, centers and institutes have contributed to the ascendancy of the great American research university (Geiger, 1990).

Whatever one’s inclinations, it would be difficult for observers not to notice the growth of these organizational entities and wonder about their rightful role. While exact counts of university-based centers may be impossible to determine, evidence suggests a substantial expansion in recent decades. The biannual Research Center Directory, for example, included 6,000 centers in 1980; 10,000 in 1990; and over 13,000 in 2003, the bulk of which are affiliated with universities. Moreover, we believe these figures are undercounts because, as discussed in the methods section in Appendix B, we identified many centers not included in the published directory.

What is a Center?

What constitutes a research center or institute? These terms are used to describe many different entities, not all of which are created equal. Previous researchers have attempted to create taxonomies for centers. Ikenberry and Friedman (1972) categorized centers as standard, adaptive, or shadow—differentiated by their stability and ability to store resources. Standard centers are permanent bureaucracies with stable goals, finances, and personnel. Adaptive centers are defined by their small permanent staff, limited resources, and constant redefinition of goals. Shadow units, also called letterhead units (Day, 1976), are those that primarily exist in the center director’s mind or file cabinet, having little or no funding, no staff, and no research space.

Day (1976) arranged centers by the nature of their work. Department-based centers house faculty from the same discipline; often they are mechanisms for attracting funding support. A more complex form is the interdepartmental center, in which researchers from multiple fields collaborate on projects that span disciplinary methodologies or organization.

These classification schemas, developed in the 1970s, offer useful ways to think about the structure of research centers but have become dated. Some universities have created even more complex centers: the inter-school or inter-institutional center, which spans schools within a university or even across universities themselves. Moreover, centers exhibit more variety, nuance, and complexity than these taxonomies capture. Is there another way to more fully portray what centers are, what they do, and how they work? This report provides greater detail of the varied structure and function of centers.
Literature on Centers and Institutes: Purposes, Strengths, Weaknesses

Centers and institutes—the historical antecedents for which can be traced to the agriculture extension stations created by the Hatch Act of 1887—proliferated after World War II with the development of the federally funded university research enterprise (Geiger, 1990). Why are centers created, what are their strengths, and what are their weaknesses?

Universities have developed centers to respond to external pressures, most notably from the federal government, to stimulate scientific, technological, economic, and social innovation in society (Ikenberry & Friedman, 1972; Teich, 1982). Research centers are a direct manifestation of the view that universities ought to contribute to the betterment of society.

A related reason for the proliferation of research centers is the response to opportunistic funding (Rogers, et al., 1999; Stahler & Tash, 1994). Centers have been developed proactively—in order to draw public, corporate, and private foundation support—or reactively, in response to implicit or explicit expectations from sponsors. Often, funding agencies are more generous with centers that maximize interdisciplinary collaborations (Friedman & Friedman, 1984). Universities sometimes create centers to generate visibility for particular research initiatives. In other cases, institutions may create centers because their peers have.

Entrepreneurial faculty members have created centers for extra flexibility and, sometimes, additional income (Smith & Karlesky, 1977). Institutes can offer faculty additional research resources, space, graduate assistants, equipment, and other perquisites that departments cannot (Ikenberry & Friedman, 1972). Centers also have been created to provide titles and status to faculty members the institution wants to retain or placate (Dressler, et al., 1969).

Centers also have been developed to promote interdisciplinary research or programs of high risk (Cunningham, et al., 1977 Friedman & Friedman, 1982; Rogers, et al., 1999). Outside the rubric of the discipline-based department, these units can explore research questions and problems that transcend traditional disciplinary methods and orientations.

This last reason has become increasingly important in the biomedical sciences. Centers and institutes have been created not only for purposes of institutional development but also in response to the evolution of science itself. Researchers are forming these entities to help nurture and develop interdisciplinary expertise and solve complex interdisciplinary problems that no one discipline can adequately address (Blumenthal, 1998; Gabriel, 2001; Sproull & Hall, 1987).

Centers have many advantages, proponents contend. Geiger (1990) argued that the creation of research centers within the university framework “was the decisive factor in the postwar expansion” of the academic research enterprise (p. 3). Through their role of expanding university research, organized research centers have made a major contribution to raising institutional reputation and prestige (Geiger, 1990). Traditionally, centers and institutes have complemented academic departments; they focus on task-oriented problems and are responsive to societal needs (Anderson, 1976; Stahler & Tash, 1994). They offer additional visibility to a specific field or area of research (Friedman & Friedman, 1984) and can react to new policy directions and new research priorities (Smith & Karlesky, 1977). Research centers are also boundary-spanning organizations, facilitating exchange of information and resources to the external environment (Rogers, et al., 1999).

The literature also notes liabilities with these organized units. First there is a concern with “mission creep” away from the educational functions of the university (Rossi, 1964; Stahler & Tash, 1994). Rossi (1964) viewed the expansion of the research center model as a segregation of the university’s research and teaching missions. Their typical focus on programmatic research conflicts with purists’ views of the purposes of the university (Ikenberry & Friedman, 1972). Centers and institutes also have been criticized for draining resources from departments (Friedman & Friedman, 1982, Ibrahim, et al., 2003). Additionally, several studies have demonstrated that centers often fail in their efforts to foster interdisciplinary collaboration (Friedman & Friedman, 1982, 1986; Hays, 1991).

Friedman and Friedman (1984) asserted that centers are typically idiosyncratic, with no defined intellectual core, no accreditation processes, and often no peers. Their implicit concern was that centers and institutes often run amok with no quality control mechanisms over their personnel, output, or intellectual cohesiveness. Other scholars expressed concern that junior faculty who are affiliated with centers can suffer in the department-based promotion and tenure process (Cunningham, et al., 1977; Stahler & Tash, 1994). Some have asserted that centers and institutes are not major contributors to the academic mission and governance structure of the university (Friedman & Friedman, 1982; Stahler & Tash, 1994).
Findings

Four Questions
The results of the 2004 AAMC survey provide a glimpse into the organizational structure and operations of centers and institutes at U.S. medical schools and research universities. We have organized the findings to answer four questions raised in the scholarly literature and often discussed by university and medical school faculty members and administrators:

1. What Do Centers Do?
What missions do centers serve? Do centers play a role in education and teaching? Do centers structure their work in an interdisciplinary manner?

2. How Are Centers Organized?
How do centers fit organizationally within the university hierarchy? To whom do center directors report? How did they obtain their posts and how are they reviewed? Do centers have a role in university governance?

3. What Resources Do Centers Have?
From what sources do centers derive their funding? Do they have assigned space? Do they provide financial support to faculty? How many personnel are affiliated with centers?

4. Are Centers Held Accountable?
What structures and policies are in place to review the performance of centers?

The results in the following sections reflect responses from directors of centers and institutes at 57 academic institutions. The usable responses represent 761 different centers or institutes, which have different missions, organization, and resources. Of the 761 respondents, 604 centers (79 percent) focus primarily on some form of research. These 604 are analyzed in depth in this report.
1. What Do Centers Do?

Many assertions have been made about the functions that centers perform, or do not perform, in academic settings. Stahler and Tash (1994) for example, declared that centers “are not major contributors to the educational mission of universities” (p. 542), a charge repeated by Crist, et al. (2003). Our findings, however, indicate that the mission and role of centers are varied, complex, and nuanced.

The 604 research centers in our study conduct a variety of tasks (Table 1). For the purposes of this report, we define “some effort” to be at least 10 percent but less than 50 percent; “a majority of effort” is considered to be 50 percent or more. Not surprisingly, 77 percent of responding research centers focus some or a majority of effort on basic research and 68 percent on clinical research. Only four research centers did not contribute any effort to basic or clinical research—they were involved in research efforts on policy, social science and humanities, or community-based intervention and prevention.

Research-oriented centers are involved in a number of other activities as well, including education (58 percent provide some effort; 3 percent provide a majority of effort), patient care (20 percent devote 10 percent or more effort), service and outreach (28 percent of centers commit 10 percent or more effort), and patenting or technology transfer (just under 10 percent provide some or a majority of effort).

It has been argued that one of the purposes of centers is to provide assistance in solving societal problems. While one can argue that clinical research activities fit into this category (after all, the purpose of clinical research is to apply basic knowledge to the improvement of health and the treatment of disease and disability), commentators have most often considered community service and outreach in this category (Hays, 1991); centers “frequently function as service agencies whose goals are shaped by their clients” (Friedman & Friedman, 1984, p. 28). For example, cancer centers designated as “comprehensive” by the National Cancer Institute must “maintain productive outreach efforts to address issues of greatest concern to [the local] community” (National Cancer Institute, 2004, p. 32). Therefore, it is interesting to note that more than a quarter of research centers in our sample have no involvement and another 44 percent devote less than 10 percent effort to service and outreach activities. While a few research centers in our sample have strong commitments to outreach functions, the majority of centers have little or none.

Commentators and scholars often cite technology transfer as another function of research centers. As biomedical science and technology become increasingly commercialized, universities have emerged as a hub of economic development through the translation of scientific discoveries into commercial products (Geiger, 2004; Powell & Owen-Smith, 2002). Geiger found that “a distinguishing feature of the current era has been the proliferation of… consumer-oriented ORUs [organized research units] linked with industry” (p. 177). In a study of 55 research centers at the University of New Mexico, Rogers, et al. (1999) found that “the stated objectives of almost all research centers… include technology transfer” (p. 699).

While technology transfer is undoubtedly an important function for the modern university and medical school, few of the research-focused centers in the 2004 survey population devoted any substantial amount of effort to patenting or technology transfer activities. Forty-six percent of all research centers have no activity in these areas; 44 percent devote less than 10 percent.
These findings differ substantially from the Rogers study, which used a very broad definition of technology transfer, including publication in scientific journals and instruction in university courses. They found technology licensing activities in only 16 percent of centers, results much more comparable to our data. These findings temper contentions about centers’ involvement with technology transfer.

A small percentage of centers devote sizable amounts of effort to these activities and perhaps that percentage will continue to increase over time, but in 2004 at least, research centers had not made patenting and technology transfer a high priority relative to other activities.

Involvement in Educational Activities

A traditional distinction between centers and departments is that departments sponsor degrees while centers do not. Clark (1998) identified research centers in the “developmental periphery,” a space separate from the “academic heartland” of teaching and service that departments occupy. To the extent that the academic heartland is defined by sponsorship and control of academic degrees, this distinction holds for the research centers in our survey population: 84 percent do not sponsor degree-granting education programs at their institutions.

It would be misleading, however, to conclude that research centers have no involvement in the educational activities of the university. In fact, the academic heartland’s terrain might be less fertile without involvement of centers and institutes. In this survey, 94 percent of research centers indicated involvement in the instruction or training of graduate students, residents, or fellows (Figure 2). Graduate students may look to opportunities in research centers for interdisciplinary activities that may not be as readily available in their home departments. Faculty may develop courses on new cutting-edge subject matter and techniques by nature of their affiliations with interdisciplinary centers.

Center involvement in educational activities extends beyond graduate students. Seventy-five percent of research centers reported that they are involved in the instruction or training of medical students, 57 percent in the instruction of undergraduate students, and 62 percent in student advising.

Are All Centers Research Centers?

As we have noted, this report focuses on the 604 centers of 761 respondents that indicated research as their primary mission. Not all centers in our study, however, identified research as their raisons d’être. The remaining centers in the study sample cited their primary mission areas as patient care (9%), education (9%), and service or outreach (4%) (Figure 1). While these percentages are not generalizable to the universe of centers at medical schools and research universities nationwide, they provide a glimpse into the varied missions of these entities in higher education.

On one hand, then, not all university centers are research centers, an important distinction when talking about these organizational entities. On the other hand, many of these non-research centers do devote effort to research activities. One-third of patient care, education, and service centers devote at least 10 percent effort to basic research; a majority (54%) focus at least 10 percent effort on clinical research. These figures indicate that even when centers have primary missions in other areas, many still spend time and energy on research activities.

Figure 1: Primary Mission of All Centers and Institutes in Study (n = 761)

![Figure 1: Primary Mission of All Centers and Institutes in Study (n = 761)](image)

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3 See Appendix B for greater discussion about generalizability issues.
While the majority of research centers do not sponsor degrees, the 85 centers (16 percent) that do are of particular interest. Traditionally the degree-sponsorship function has been the prerogative of academic departments. That being the case, how might we think about centers that also have this function?

Centers that sponsor degree-granting programs have unique resources that set them apart from other centers—they are more likely to offer primary appointment and salary support to faculty and they garner more funding and space—which allow them to function in ways akin to more traditional university departments (see Table 2). For example, degree-granting centers are more likely than other centers to have one or more faculty who receive full salary support (46 percent versus 33 percent), and more likely to have at least one faculty with a primary appointment in the center (32 percent versus 21 percent). The median funding for degree-sponsoring centers is greater than the median for non-degree-sponsoring research centers ($3.9 million versus $2.0 million). Similarly, university funding is significantly greater for degree-sponsoring centers (means = $808,451 versus $359,233; median = $300,000 versus $49,750). Degree-sponsoring centers also have more assigned space than other research centers (28,516 net-assignable square feet versus 19,810). These elements of faculty resources, university and external funding, and physical space provide evidence that these centers have assumed many of the characteristics of departments. We suggest, therefore, that they are departments-in-waiting. While it remains to be seen whether this subset of research centers will achieve department status, our hunch is that some will, and many already may operate like departments, just without the designation.

How Interdisciplinary are Centers and Institutes?
Centers and institutes are typically allied with interdisciplinary research. In fact, these units exist, it is often argued, to convene researchers from many fields (Cunningham, et al, 1977; Friedman & Friedman, 1982; Rogers, et al., 1999). This notion is certainly true in the biomedical arena. Research centers allow faculty from a variety of disciplines and schools to join forces around a common research question, technique, organ system, or disease. Calls for a greater emphasis on interdisciplinary scientific collaboration abound in the United States and throughout the world (Barnhill, 2004; Colwell, 2002; European Union Research Advisory Board, 2004; Metzger & Zare, 1999; National Academy of Science, 2004; Rhoten, 2004). For example, embedded in the NIH’s recent “roadmap” for medical research is the idea that the future research workforce needs to develop collaborative teams in addition to individual scientists (Zerhouni, 2003). These calls for collaboration in scientific and other disciplines have been heard for decades (Abbott, 2002; Weingart, 1997).
But do centers really operate in interdisciplinary ways? Previous research has concluded that they do not. Friedman and Friedman (1982) found less than one-third of centers in the biological sciences and half of the centers in the medical sciences had interactions with more than one department; interactions with more than three departments were less common. By comparison, centers in the 2004 AAMC survey involved faculty from a greater number of departments (mean = 4.89, median = 4). Only 15 percent of centers included faculty from a single department in 2004; 70 percent of centers included faculty representing three or more departments (Table 3).

Both Friedman and Friedman (1982) and the AAMC study defined an interdisciplinary approach to research as faculty from different disciplines working together on the same project, and a multidisciplinary approach as faculty from different disciplines working independently on different aspects of a project. In the Friedmans’ 1982 study, only 20 percent of medical science centers and 24 percent of biological science centers stated that their approach to work could be characterized as interdisciplinary. The 2004 AAMC survey found, however, that modern centers and institutes in the biomedical and health-related research fields embrace more interdisciplinary approaches to their work than similar types of centers in the 1980s. Forty-two percent of the research centers and institutes indicated that their approach to research was interdisciplinary, with an additional 39 percent indicating multidisciplinary, 7 percent unidisciplinary, and 12 percent some combination of the categories.

These results, coupled with other recent research, suggest that research centers offer faculty members opportunities for interdisciplinary activities and collaborations beyond what exists in the disciplinary-based departmental structure. In a study of NSF-funded centers, for example, Rhoten (2003) found that 60 percent of researchers believed their research activities within the center qualified as multi- or interdisciplinary, compared with 51 percent of their research outside the center. Furthermore, the center itself facilitated these interdisciplinary relationships: 84 percent of connections among researchers from different fields within a center were initiated after the founding of the center (Rhoten, 2003).

If science has become more interdisciplinary over time, is there a trend for newer centers to be more interdisciplinary than older centers? We divided the research centers in our sample into two categories—one representing “older” centers (those that were established in 1992 or earlier—the median date) and one representing “newer” centers (those established in 1993 or after). Using the same definitions of interdisciplinary and multidisciplinary noted above, we found that newer clinical research centers are more likely to be interdisciplinary and less likely to be multidisciplinary than older clinical research centers. Newer basic research centers are more likely to be multidisciplinary and less likely to be unidisciplinary than older basic research centers. These results lend support to the ideas of a trend toward more interdisciplinary approaches to research.

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Table 3: Comparison of Interdisciplinarity and Faculty Involvement in Centers, 1982 and 2004 (in percent)

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<thead>
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<tr>
<td></td>
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<td>categories</td>
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<td>Departments represented in work:</td>
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<td>69</td>
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<tr>
<td>3 departments or more</td>
<td>38</td>
<td>19</td>
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</table>

* For comparative purposes, we adopted the same definitions for inter-, multi-, and unidisciplinary as Friedman and Friedman (1982). Interdisciplinary is defined as faculty from different disciplines working together on the same project; multidisciplinary is defined as faculty from different disciplines working independently on different aspects of a project; and unidisciplinary is defined as faculty from a single discipline working together, using consultants from other disciplines as needed.

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4 Friedman and Friedman adopted these definitions offered by Alpert (1969). For comparative purposes, we used the same framework in our 2004 survey.
2. How Are Centers Organized?
Unlike academic departments, which have a similar structure from one institution to the next, centers are diverse in their organization. This section describes how centers are integrated into the structure of the university, what characteristics center directors have assumed, and how centers are organized administratively.

Centers in the University Hierarchy
Previous research has noted that centers are “at” the university but not “of” it (Ikenberry and Friedman, 1971). That is, centers operate at the periphery of the university, not at the core. Traditional departments, many have argued, “are located at the heart of the university” (Rossi, 1964, p. 1160) and are integral to the very nature of the academy (Abbott, 2002; Stahler & Tash, 1994). While centers serve discrete, and important, purposes, traditional orthodoxy instructs that they “will never replace academic departments in terms of organizational primacy” (Stahler & Tash, 1994, p. 552).

More recently, however, commentators have noted concern about the preeminence of the academic department (Fischman, 1998; Galbreath, 2004; Ibrahim, et al., 2003). Centers and institutes, it has been argued, can impinge on departmental integrity, usurp power and influence, and create divided faculty loyalties. Undoubtedly, there are cases where these circumstances have come to pass.

Are centers moving from the margins to the mainstream? Do they pose a threat to the organizational structure of departments? The data from our center survey suggest that the answer to both questions, for the majority of centers, is “no.” In the main, most centers remain peripheral organizational units that serve limited (albeit important) functions and are not poised to acquire the status and authority of departments.

Reporting relationships are one indicator of status and authority. Only 15 percent of centers reported to the university president or chancellor, provost, independent board of trustees, or multi-college committee. Reporting to one of these individuals or groups implies that the unit has—at least on paper—access to important campus decision makers and may suggest an entity of considerable prestige. The vast majority of centers, however, do not enjoy such relationships. A plurality of centers (46 percent) report to the medical school dean or graduate school dean, which, prima facie, implies an on-par status with academic departments.

Another 34 percent of centers report to an associate dean, department chair, or another center director. Five percent indicated other types of reporting relationships (see Figure 3). From a structural point of view (in which formal organizational components are suggestive of how the organization functions), these reporting relationships imply that more than one-third of centers have less status than, and nearly one-half have similar status as, academic departments.

Another way to look at how centers fit into the university hierarchy is through a human resource or political frame, where opinions and perceptions of power and importance matter. This perspective reflects another dimension of the way centers and institutes function in the university. As measured by the opinions of center directors themselves, a complex story emerges: while most center directors do not believe their units occupy a place near the core of the university’s decision making and power, they see an increasingly important role nonetheless.

Figure 3: Reporting Relationships of Centers
Fifty-seven percent of center and institute directors in our study disagreed or strongly disagreed with the idea that centers and institutes will eventually replace traditional departments; another 23 percent were neutral (Figure 4). Over three-quarters of the directors did not believe that centers and institutes had more power than academic departments in institutional governance; another 18 percent were neutral and only 5 percent agreed. Forty-nine percent of directors disagreed or strongly disagreed with the statement that centers and institutes are adequately represented in institutional governance; another 24 percent were neutral. These results indicate that, on average, directors of biomedical centers and institutes believe that their organizations remain in the margins of institutional power, influence, and decision making.

These findings do not mean, however, that centers are marginal to mission. The majority of directors believe that centers at their institution are essential to the fulfillment of the university’s mission (97 percent agreed or strongly agreed); over 80 percent agreed or strongly agreed with the idea that there will be more centers created at their institution in the future; and 94 percent agreed or strongly agreed with the idea that interdisciplinary research centers will be more important in 10 years than they are today.

Taken together, these data suggest that, despite their strong and important presence, the vast majority of research centers remains in the suburbs, if you will, of the university metropolis. But not all do. Further examination reveals that a select group of research centers are more closely aligned with the university core.

**Figure 4: Opinions of Center Directors**

- **Research centers will eventually replace traditional academic departments**
- **Centers have more power than academic departments in institutional governance**
- **Centers at my university are adequately represented in institutional governance**
- **Centers at my institution are essential to the fulfillment of the university’s mission**
- **In the future, there will be more research centers created in my institution**
- **Interdisciplinary research centers will be more important in 10 years than today**
Those centers that report to a university president, provost, independent board of trustees, or multi-college committee (what we will call “Power Centers”) tend to have more overall funding, more funding from the university, and larger staffs than other centers (Figures 5a, 5b, 5c). These resources lead some Power Center directors to think of their units more expansively than most centers directors do. A greater proportion of Power Center directors, for example, are more likely to believe that research centers will eventually replace traditional academic departments than do those reporting to an associate dean, department chair, or another director (27 percent compared to 17 percent).

**Center Directors**

Emmert (1985) notes how important center directors are in sustaining their units. Directors work to facilitate the center’s integration into the university, thereby influencing how the center interacts with departments and the rest of the institution. “[Organized research unit] problems are fundamentally political problems with the director serving as boundary spanner between the [center], the rest of the university, and external clients” (Emmert, 1985, p. 33). In some cases, the very success and continued existence of a center may depend on the director (Stahler & Tash, 1994). What types of career experiences and backgrounds do directors typically have?

Center directors tend to be tenured full professors. Ninety-nine percent of the responding center directors have a faculty appointment, 80 percent are full professors, and 88 percent are tenured. The vast majority do not have other major administrative appointments such as department chair, associate dean, director of another center, or hospital department chief.
Forty percent of center directors were the founding director. Another 36 percent worked at the center before becoming the director. It is perhaps unsurprising, therefore, that for two-thirds of center directors, no search committee was involved in their appointment as director. The lack of a national search for many director positions is a telling sign about the degree of integration into academic norms and customs. Academic search processes are ceremonies and rituals (Birnbaum, 1988) and legitimize both the process and the outcome in the eyes of the university community (McLaughlin and Riesman, 1990). Thus, a position for which no search is conducted may signal that it is not important to the core mission of the university or worthy of attention. The fact that many directors are the center founders testifies to their entrepreneurship; the lack of search committees testifies to the adaptive and opportunistic ways in which centers are created.

**Administrative Organization**
Another element of center organization is internal structure. Based on our data, we devised four models of center administrative structure. First, the majority of the research centers in our sample (57 percent) are freestanding—that is, they are not under the administration of a larger center nor do they control other centers (Figure 6). Another 95 centers (16 percent) are “umbrella centers”—that is, they have other centers under their administrative control; 130 (22 percent) are “component centers”—they exist administratively under another center; and 32 (5 percent) are “offspring centers”—they are offshoots of a larger center but also reproduce themselves, creating a family tree of centers descending from the original.

Component centers and offspring centers have characteristics suggestive of “mini-centers.” Compared with other centers directors in the survey sample, the directors of component and offspring centers are less likely to be full professors or to have tenure and more likely to be assistant professors. This feature may indicate that component and offspring centers serve an important step in developing talent to lead the research enterprise. Directing these centers may be similar to serving as division chief and program director—an important role in and of itself and, for some, a stepping-stone to larger leadership opportunities.

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**Figure 6: Four Models of Center Administrative Structure**

- **Freestanding Center**
- **Umbrella Center**
- **Component Center**
- **Offspring Center**
3. What Resources Do Centers Have?

One of the unknowns in our knowledge of centers involves resource base: how much space, money, and personnel do centers control? What constitutes a large versus small center in these domains? This survey collected data in order to put parameters around these characteristics.

Center Funding

The 604 research-oriented centers in the survey population garnered $2.9 billion in overall funding (as measured by expenditures5) in the most recent fiscal year for which data were available—a sum that suggests, in toto, these entities do indeed fulfill one perceived benefit, to serve as mechanisms to attract financial resources. The average amount of funding for basic research centers was $5.3 million, compared to $4.7 million for clinical research and $8.2 million for other types of research. Although several very well-funded centers skew the means, median financial resources ($2 million for all research centers) are still sizeable.

In comparison, basic science departments at the top-40 research-intensive medical schools had, on average, $6.3 million in research grant funding in 2003, suggesting that the typical center is of similar size to the typical basic science department in terms of research funding. On average, research centers derive a majority of their funds from government grants and contracts (63 percent). Universities supplied 13 percent of the funds, followed by private foundations (8 percent), industry/corporate funding (5 percent), center endowment (4 percent), other resources (3 percent), patient care services (2 percent), and direct state funds (2 percent). These data belie a common assertion in the literature that the vast majority of centers are not funded by external sources (Stahler & Tash, 1994). For biomedical and health-related centers at major research universities and medical schools, most funding comes from outside the university.

These findings also temper another perception in the literature: that centers and institutes exist to facilitate interactions with industry. For example, Geiger (2004) claimed that centers and institutes “stimulate the development of… ‘third-stream incomes sources’—beyond base budgets and regular research grants—that diversify and augment funding. Today, third-stream income comes largely from engagement with industry” (p. 69). The centers in this sample, however, derive scant funding from industry and corporations. In fact, we might reasonably conclude that centers and institutes primarily stimulate the development of mainstream—not “third-stream”—income sources.

Centers appear to benefit (or suffer) from what Robert Merton (1968, 1988) identified as the Matthew Effect in science—the accumulation of advantage and unequal distribution of resources.6 Large amounts of center funding from one source are highly correlated with large amounts of funding from another source. As government research funding grows at a slower rate in the future, some have suggested that universities will turn to industry for support (Powell & Owen-Smith, 2002). Our data suggest that centers do not pursue an “either-or” strategy for seeking resources. Rather, the best-funded centers acquire money from all sources to create a situation of accumulative advantage: “to those that have, more shall be given.”

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5 Medical schools typically account for funding in terms of expenditures, especially important for grants and contracts when funding is accounted for when the grant is expended, not when it is received.

6 Merton derives the phrase “Matthew effect” from a passage in the biblical book of the same name, which reads: “For unto everyone that hath shall be given, and he shall have abundance; but from him that hath not shall be taken away even that which he hath” (qtd. in Merton, 1988, p. 609).
Space
Physical space is one of the most valuable currencies within higher education institutions. The vast majority of research centers (91 percent) are assigned their own physical space. On average, research centers have over 20,000 net-assignable square feet of space (Table 4). Research centers ranged from having a minimum of 20 square feet (the size of a closet) to a maximum of 360,000 square feet, with the median at 7,495. As with other measures, several very large centers skew the mean.

When coupled with other indicators of organizational complexity and control—such as power of appointment, salary support, and levels of funding—physical space may contribute to understanding the significance of a center. Assigned physical space, in and of itself, however, does not appear to be an indicator of size or status. The 53 “virtual” centers that have no space do not differ significantly from those with space in terms of staffing, faculty affiliations, or reporting relationships. The directors of virtual centers do not view their role in institutional governance differently from directors of centers with space. The absence or presence of space, therefore, may not be a good indicator of the center’s ability to catalyze faculty, coordinate other research staff, contribute to the research mission, or influence people and priorities.

Virtual centers do differ significantly from centers with space in two interesting ways. First, on average they presumably require and seek less funding. Second, the directors of centers without space were far less likely to have had a search committee for their position than those with space (8 percent versus 37 percent). This difference may suggest that virtual centers are more spontaneous and less formal than others. Also, directors of virtual centers may be considered more of a service or voluntary position than a formal administrative position within the university hierarchy.

People
As measured by the number of people, centers are, on average, quite small (Table 5). While the average number of faculty and staff give these centers the look of an academic department, several very large centers again skew the mean. One cancer center, for example, reported 2,700 total personnel, including 2,000 professional research staff. Three-quarters of all research centers report 20 faculty members or fewer and 10 or fewer each of professional research staff, postdoctoral appointees, and graduate students.
Faculty
Centers bring together faculty from a variety of disciplines. The faculty affiliates identified by center directors have appointments in clinical departments (45 percent), followed by basic science departments (26 percent), in university divisions outside the medical school (18 percent), in the center (7 percent), in other centers (2 percent), or at another university (1 percent) (Figure 8).

When considering the center as the unit of analysis, just over 40 percent of centers have one or more faculty members with appointments outside the medical school (i.e., in other university schools or colleges), while 12 percent of centers have one or more faculty members with appointments in other universities. Both of these findings indicate that centers can facilitate interaction between researchers from different disciplines, schools, and even institutions to cross traditional boundaries and work on problems of mutual interest.

Telling indicators of centers assuming department-like status would be their ability to appoint faculty or pay faculty salaries. Traditionally, academic departments have maintained the sole prerogative to appoint faculty and serve as the locus of faculty compensation. Centers and institutes with authority in one or both of these areas would indicate an important shift in university organization and structure.

The survey results indicate that this shift has not occurred. First, most centers do not appoint faculty. Three-quarters of all research centers have no faculty with primary center appointments (Figure 9). This finding is similar to Ikenberry and Friedman’s 1972 study, which found that two-thirds of centers do not have appointment authority. Of the 117 research centers in our sample with appointment authority, 31 directly appoint all center faculty. The remaining 86 (73 percent) have the power to appoint faculty but do not exercise that authority in every case—on average, 56 percent of all faculty affiliates in these centers are directly appointed.

Second, centers provide no salary support to the majority of faculty affiliates (63 percent); 27 percent of faculty receive partial salary support, and only 10 percent of center-affiliated faculty receive full salary support. These findings support the assertion that academic departments are maintaining their primacy in the work life of faculty members.
Professional Research Staff
Faculty members do not fuel the engine of biomedical research alone, of course. A cadre of graduate students, postdoctoral appointees, residents, fellows, and others are involved in the complex work of research. Universities also employ non-faculty researchers—often called professional research staff—who are Ph.D. scientists performing similar research functions as faculty but without faculty status. Emmert (1985) asserted that professional research staff may offer more specialized skills to the center than faculty and may feel a greater sense of accountability and identity to centers given that they do not have departmental appointments.

Our survey asked several questions to determine whether and how professional research staff have access to advantages and opportunities typically reserved for faculty: principal investigator status, participation in the academic senate, participation in school- or university-level policy committees, eligibility for institutional grievance procedures, and sabbatical leaves (Figure 10).

The survey results indicate that professional researchers have access to some prerogatives once solely reserved for faculty, but not for others. The coin of the realm for an independent research career is achieving principal investigator status. Fifty-nine percent of responding research centers indicated that professional research staff members can be principal investigators. Another symbol of faculty status is eligibility to participate in academic governance. Just over half of the research centers (52 percent) indicated that professional research staff are eligible to participate in school- or university-level policy committees, where important decisions are often vetted and finalized, and one-third of centers indicated that non-faculty researchers can participate in the academic senate. Professional researchers typically have access to institutional grievance procedures as well.

Another indicator of faculty status is sabbatical leave. Here, professional research staff are more likely denied a privilege of faculty members. Only 21 percent of research centers indicated that professional research staff are eligible for sabbatical leave. We asked center directors whether they felt that their university has adequate policies to promote and retain non-faculty professional research staff. Here, respondents were almost evenly split: 36 percent agreed with the statement, almost 30 percent were neutral, and 35 percent disagreed, suggesting that promotion and retention policies for professional research staff differ from institution to institution.

![Figure 10: Percentage of Professional Research Staff Eligible for Faculty Benefits](image-url)
4. Are Centers Held Accountable?
The scholarly literature on centers includes criticisms that centers often are not sufficiently accountable for meeting their goals and objectives (Friedman & Friedman, 1984; Stahler & Tash, 1994). This criticism involves both structure and process. First, universities are thought to lack structures to review centers on a regular basis. Second, the process by which research centers are reviewed and assessed is thought not to be rigorous enough to terminate centers that do not meet goals or do not contribute substantially to the university’s mission.

We will not address the latter criticism here. The relative strengths and weakness of the evaluation process is an issue that pertains not only to organized research centers but to academic departments, administrative units, even faculty promotion and tenure decisions. The center director survey did, however, inquire about the existence of particular accountability structures: program review, advisory committees, and term limits.

Program Review
For the research centers in the study, 79 percent are subject to periodic program review: of those, 40 percent are reviewed once a year; 38 percent are reviewed every five years, with the remainder reviewed at different intervals. These findings are consistent with previous research (Friedman & Friedman, 1986). A formal program review is, at least in theory, one way that the university can ensure that its centers continue to serve useful purposes, meet goals, and contribute to the school’s mission.

About 80 percent of centers have at least one external reviewer on the review committee (of those, 51 percent have both an internal and external reviewer). The presence of external reviewers may strengthen the credibility and objectivity in the review process, as compared to a review by insiders only.

Advisory Committees
In addition to program reviews, advisory committees can serve as proxies for accountability, peer-review, and breadth-of-exposure. Advisory committees take different forms—some give advice but have no authority; others may have some say in the administrative and financial aspects of the center. About 75 percent of research centers in the sample have at least one advisory committee.

More telling than just the presence of these committees, however, may be their actual composition. Critics have argued that outsiders to the university can heavily influence centers (Friedman & Friedman, 1984; Stahler & Tash, 1994). One measure of this influence is the presence of government, industry, and community representatives on center advisory boards. Conversely, centers with advisory boards composed only of internal faculty suggest units that may be somewhat insular.

Our results demonstrate that faculty members largely regulate research centers. On average, sixty-five percent of the members of advisory boards of research centers are faculty members: 41 percent internal and 24 percent external (Figure 11). Government representatives and industry sponsors rarely constitute any appreciable percentage of advisory board membership (although only one or two members from government or industry may have considerable influence). Rather, most research centers do not include advisory board members from the federal or state government or industry, even when they receive financial resources from those sources. These patterns reflect the age-old standard of academic freedom from outside pressures.

Those directors who operate without an advisory panel are statistically more likely to report to a department chair than those with advisory committees, who are more likely to report to medical school deans or provosts. When centers are not housed within a department, advisory committees can serve as surrogates for local faculty oversight. But these
correlations suggest another implicit purpose of center advisory committees. In addition to providing a source of guidance, expertise, oversight, and review, advisory committees—like a higher-level reporting relationship—may serve a symbolic function within the university, signaling that the center has visibility in and importance to the university. Advisory committees, in other words, may be signals of legitimacy in the social milieu, a certificate of authenticity.

**Term Limits**

“Once born, the hope is often expressed that the institute will self-destruct when its mission is accomplished, but that rarely happens,” claimed Dressel and colleagues (1969). Anecdotal data confirms the impression that few centers go away. Centers, however, typically are not structured from their start to meet their demise. Most centers do not have term limits; their “length of contract” does not appear to be a regularly used means of ensuring accountability to mission and purpose. The contract term of most centers in the sample is indefinite or not clearly defined (73 percent combined). The remaining centers are subject to a limited number of years with possibility for renewal (Figure 12).

These terms can be compared to the contract arrangements universities have with their faculty. Tenured faculty members have an indefinite contract length, dismissible only for cause. Non-tenure-track faculty typically have multi-year contracts with the possibility of renewal. Without using the same language, universities operate nearly all centers on one of two similar arrangements—a tenure-like arrangement (those with indefinite term length) or multi-year contracts.

The existence of specific term limits may not be the best indicator of whether centers are appropriately phased out, or as Churchman memorably suggested, of whether they are subject to organizational suicide or murder (1976). Given the high percentage of financial resources that come from outside sources, universities may leave the “live or die” decisions to the funding marketplace. Funding agencies are unlikely to re-fertilize a research center that has not produced fruit.

The period for the most stringent review of a center’s length of contract may well be at its creation. “It is far easier to deny a building permit than to demolish a finished house” (Friedman & Friedman, 1984, p. 29). Friedman & Friedman (1986) also note, however, that “[organized research units] are a tenacious lot. Like all organizations, they build in self-maintenance mechanisms to find ways to extend their life spans beyond their original mandates or social utility” (p. 95). When centers continually receive (or seize) clemency from termination, other forms of accountability become important. With a high percentage of centers in our sample subject to program review, universities and medical schools can instill accountability through careful periodic reviews of mission, scope, and outcomes.

**Figure 12: Term Length of Research Centers and Institutes**

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<thead>
<tr>
<th>Contract Term</th>
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<tr>
<td>Indefinite</td>
<td>61%</td>
</tr>
<tr>
<td>Limited number of years; possibility for renewal</td>
<td>26%</td>
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<tr>
<td>Limited number of years; no possibility for renewal</td>
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</table>
Conclusion

What do we talk about when we talk about research centers and institutes? The data in this report indicate that we refer to organizational units with many different purposes, forms, sizes, and scope. When discussing the nature, mission, structure, and organization of biomedical and health-related centers and institutes in research-intensive medical schools and universities, we are reminded that the typical nomenclature of “center” and “institute” may be too general and too vague to properly account for the variety, nuance, and complexity of these research units. Perhaps a more standardized, more precise lexicon is needed.

Centers and institutes can be big or small, well-heeled or meager in resources, freestanding or embedded in a complex administrative structure. Centers with substantial funding from one source typically will have substantial funding from other sources as well. Centers with prestige and visibility in reporting relationships tend to have larger staffs and substantial financial resources. Despite their contributions to academic mission, most centers do not appear to be threatening the primacy of academic departments, at least not in terms of power over faculty appointment and compensation.

The data in this report have the following implications for medical school and university faculty, department chairs, center directors, and administrators:

1. Research centers and institutes make important contributions to the interdisciplinarity and research mission of academic institutions. Research centers are important and integral mechanisms for supporting, sustaining, and growing the research enterprise.

2. Most research centers remain on the margins of institutional power, prestige, and influence over institutional decision making. In general, departments continue to occupy a more central position than centers. A subset of centers, which we call “power centers,” may be exceptions to this generalization by dint of their considerable reach and resources; they have more funding, larger staffs, and accessibility to institutional decision makers.

3. Most centers are subject to accountability measures, but the extent to which those measures are effectively defined and implemented surely vary. We found that the majority of centers do not have defined lengths of term, contributing to the impression that centers never die. Universities and medical schools may want to consider the use of term limits—limiting the center’s length of contract with the possibility of renewal after a successful periodic review—as an added measure of accountability.
Accountability depends not only on whether adequate structures exist (e.g., term limits, program reviews, advisory committees), but on how well they work. Centers and institutes may have to answer not only to the medical school or university but to other groups as well (e.g., government, private foundations, and other funding sources), all with different review processes, different notions of what accountability is, and different interests at stake. We wonder if the problem that arises is not the failure to review the center’s ability to meet its goals and objectives, but rather the distraction of having to prepare review reports to many stakeholders, each of which may focus on a narrow interest or be of limited scope.

4. More precise definitions are needed so faculty and administrators can communicate more effectively about centers and institutes. Paradoxically, scientific research demands a common, distinct, and exact vocabulary, yet with regard to centers and institutes—where much scientific research takes place—there is a dearth of precise descriptive terminology. The entities vary so widely—both among and within universities and medical schools—in their scope, size, and mission that “centers” and “institutes” mean different things to different people. The lack of common definitions also makes it difficult to categorize the various forms that centers and institutes take; a more precise taxonomy of these entities would aid the academic community’s understanding of what they are and how they work.

For example, universities could use the term “institute” to designate inter-school entities having multiple missions of importance to the whole institution, reporting to the president or provost, and having faculty from many academic units across the institution. “Center,” by contrast, could designate a school-wide entity with a more limited mission and scope, reporting to a dean, and having the majority of faculty affiliates from that school. “Programs” could refer to interdisciplinary or inter-departmental curricular ventures designed to deliver educational material rather than conduct research.

Our intent here is not to prescribe but only to remind that language matters. Some of the management and administrative challenges that emerge with centers and institutes are caused by aggregate groupings of disparate entities with little in common. Putting more precise definitions around centers, institutes, programs, and departments—and the responsibilities, rights, and privileges of each—could go a long way in solving some of these challenges.

Future Studies
It is our hope that this report provides insight to the organization and structure of centers in the academic research environment; however, descriptive statistics can paint only a partial portrait. Other questions remain: How do centers fit into the organizational culture of the academy? How do faculty—especially junior faculty—relate to and interact with centers and departments? What are the implications of the center structure for academic leaders? Future work of the AAMC Project on Centers and Institutes will address these additional questions.
APPENDIX A: Description of Project Research Agenda

PHASE I: Survey of the Status of Centers and Institutes in U.S. Medical Schools and Research Universities
In winter 2003-04, we surveyed the directors of 761 centers and institutes affiliated with medical schools and research universities in the United States to determine their size, scope, extent of effort, and range of activities.

PHASE II: Case Studies of Innovative Models of Organization
In spring 2004, we completed six site visits to medical schools and universities that have significantly grappled with and developed new approaches to organizing their medical research enterprise. We focused on medical schools that have significant research enterprises and have committed resources to interdisciplinary and inter-college initiatives.

PHASE III: Survey of Faculty Work Life
In winter 2004-05, we conducted a survey of activity, behavior, and attitudes of faculty who are affiliated with research centers and institutes. The literature on university faculty members has repeatedly documented that the changing nature of faculty work life is creating angst among all faculty, especially junior faculty. The survey instrument asked faculty about the direction and extent of their activities, their involvement with centers, their perceptions of the tenure and promotion process, and their level of satisfaction with the dimensions of their work.
APPENDIX B: Research Methods

Survey Procedure

The data discussed in this report come from a 37-item survey instrument administered to directors of biomedical and health-related center and institutes located within research-intensive medical schools and research universities. Center directors voluntarily participated in the survey and their identities remained confidential. We obtained 761 usable responses.

We constructed the instrument based on surveys used in previous research, particularly Ikenberry and Friedman (1972) and Friedman and Friedman (1982, 1986). These surveys contained questions related to structure, staffing, governance, and funding of centers and institutes. We included additional questions and revisions based on a review of the literature, our perceptions of important issues, and consultation with a national advisory board.

Survey Population

One of the difficulties in studying centers is the absence of a single authoritative compendium of such entities at medical schools and research universities. By their very nature, many centers are loosely organized, even transitory. While the university or academic school may officially recognize some centers (so that they are visible and identifiable), individual faculty members, divisions, or departments may unofficially organize others—meaning that they may be informal, unauthorized, or nameless. Consequently, the university itself may not be able to produce a complete list of all centers that exist under its aegis. In a study of research centers at the University of New Mexico, for example, “the actual number of centers… was surprising to the most knowledgeable individuals like university administrators and directors of research centers” (Rogers, et al., 1999, p. 692).

A subset of centers is, in effect, a “hidden” population. A population is considered “hidden” when no sampling frame exists—that is, the size and boundaries of the population are unknown (Heckathorn, 1997). Like anthropologists and sociologists who study transient populations, homeless communities, or other “geographically mobile” groups, we were faced with the difficulty of obtaining a true census of centers from which to draw a sample because a portion of centers is hidden.

We began to place limits around this population by focusing only on centers and institutes at research-intensive institutions. The history of centers and institutes suggests that they are integrally tied to the research mission of the university. The universities and medical schools most likely to have sustained, mature center populations, we reasoned, would be more likely to have the highly developed research enterprises. Therefore, we targeted centers at institutions that met one or both of the following criteria:

1) The 40 medical schools that received the most research funding from the National Institutes of Health (NIH) in 2002. NIH research funding is the most common measure of research intensity in the medical school community.

7 A copy of the survey is found in Appendix C.

8 A list of advisory board members is found in Appendix D
Members of the Association of American Universities (AAU) that have a medical school. The AAU is a limited-membership organization of the most research-intensive universities in the United States. Thirty universities already met our criteria because their medical schools were in the top-40 NIH ranking. Another 17 AAU-institutions with medical schools were included even though their medical schools were not in the top-40 NIH ranking. We included this second criterion to broaden the list of institutions included in our university population.

The Research Centers Directory (RCD), a biannual compendium published by Gale Publishers, is a popular source of information about centers and institutes at universities in the United States. Using this publication as a sole source of information, however, is inadequate because (1) the data-collection methods for the directory are not published, raising questions about the credibility of the data; and (2) a cursory comparison of the RCD with information included on universities’ Web sites suggests that the RCD is both dated (i.e., it includes centers that have since closed or changed names) and incomplete (i.e., it excludes many centers).

Rather than rely on only one data source, we compiled our data from two sources: first, we included centers listed in the “Biological and Environmental Sciences,” “Medical and Health Sciences,” and “Multidisciplinary Programs” sections of the RCD. Second, we searched the listings of centers and institutes on the Web sites of the medical schools and universities in the population. For both databases, we determined that the following types of units should be excluded from our search:

1. Departments
2. Educational programs
3. Laboratories that are physical spaces for testing and analysis rather than a discrete organizational unit for conducting research
4. Centers that are only physical buildings or locations
5. Centers and institutes that focused solely on outreach (e.g., community service) activities
6. Independent organizations with nominal academic affiliations
7. Centers that exclusively performed surgical or other clinical procedures and did not have a research function

For each listing, we compiled the center name and mailing address, center director name and e-mail address, and university affiliation. Next, we merged the listings from these two sources (RCD and Web-based) and removed duplicate listings. Ultimately, we included 1,450 centers and institutes at the universities in the survey population.

Survey Administration
We launched a pilot survey in August 2003 to ensure validity and reliability. From November 2003 to February 2004, we administered the full survey to all 1,450 center directors. We adapted a modified version of the Tailored Design Method (Dillman, 2000) to encourage a high response rate. An announcement letter preceded the launch of the Web-based survey. E-mail reminders were sent to participants two times: the first, three days after the survey was launched, and the second, two weeks after the launch date. We made a final contact with non-respondents by mailing a print copy of the instrument four weeks after the initial launch date. The overall response rate of useable surveys was 52.5 percent, with 761 directors returning the instrument.

9 The Research Centers Directory (2003) contains 17 disciplinary categories. We did not focus on sections such as agriculture, physical sciences and engineering, private and public policy, social and cultural studies, and research coordinating offices and research parks.

10 The Tailored Design Method (Dillman, 2000) uses principles of social exchange theory to bolster survey completion rates. It consists of carefully constructed communications describing the survey’s importance and usefulness for the survey population. The survey population is contacted five times: (1) a pre-survey announcement, (2) an invitation and survey instrument; (3) a reminder announcement; (4) a replacement survey sent to nonrespondents; and (5) a final request with replacement survey. The TDM protocol has been associated with higher response rates than traditionally expected in mail surveys.
APPENDIX C:
Survey of Directors of Centers and Institutes

This survey is being conducted as part of a national research project on centers and institutes affiliated with medical schools or research universities. The survey will provide national data on characteristics of centers and institutes such as size, scope of activities, organization, management, and governance.

All responses are confidential. Institution- and person-specific identifiers will be removed from responses and only de-identified aggregate data will be analyzed and reported.

Thank you for completing this survey. If you have any questions about the survey or the research study, please contact centersandinstitutes@aamc.org.

ADMINISTRATION

1. In what year was your center/institute established in its current form?

   Year: __________

2. How long is the term of your center/institute?

   - Not clearly defined
   - Indefinite
   - Limited number of years; possibility for renewal
   - Limited number of years; no possibility for renewal

3. Please check the one activity that you consider to be your center/institute’s primary mission.

   - Basic research
   - Clinical research
   - Other type of research
     (Specify:____________________)
   - Education
   - Patient care
   - Service/outreach
4. Please indicate the approximate amount of effort your center/institute devotes in each of the following activities.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Percent Effort</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>None</td>
</tr>
<tr>
<td>Basic Research</td>
<td>□</td>
</tr>
<tr>
<td>Clinical Research</td>
<td>□</td>
</tr>
<tr>
<td>Education</td>
<td>□</td>
</tr>
<tr>
<td>Patient Care</td>
<td>□</td>
</tr>
<tr>
<td>Service/Outreach</td>
<td>□</td>
</tr>
<tr>
<td>Patenting/Technology Transfer</td>
<td>□</td>
</tr>
</tbody>
</table>

5. Are there center(s)/institute(s) under the administration of your center/institute (i.e. does your center/institute serve as an umbrella for other centers)?

- Yes
- No

6. Is your center/institute under the administration of a larger center/institute?

- Yes
- No

7. Which one statement best describes your center/institute’s approach to research?

- Faculty from different disciplines work together on a single project.
- Faculty from different disciplines work independently on different aspects of a project.
- Faculty from a single discipline work together, but have assistance from consultants in other disciplines.
- Other, describe ________________________________

8. Does your center/institute have advisory committee(s)?

- Yes
- No (Skip to Question 9)

8a. (If Yes) How many advisory committees does your center/institute have?

_____
8b. (If Yes) How many people are on your main advisory committee?

Number of people

a. Administrators from your institution? _______

b. Administrators from other institutions? _______

c. Faculty members from your institution? _______

d. Faculty members from other institutions? _______

e. Governmental representatives? _______

f. Industrial sponsors? _______

g. Community representatives? _______

h. Other? (Specify: __________________________) _______

9. Is your center/institute subject to periodic program review?

☐ Yes

☐ No → (Skip to Question 10)

9a. (If Yes) What is the frequency of the review? Every ________ year(s)

9b. (If Yes) Who conducts the review? (check one only)

☐ Internal reviewers only

☐ External reviewers only

☐ Both internal and external reviewers

FUNDING AND FACILITIES

10. What is your center/institute’s total amount of expenditures in the most recent fiscal year for which data are available?

$____________

11. Please indicate, in percentages, the following sources of your center/institute’s expenditures.

Percentage of total expenditures

a. University funds? ______ %

b. Government grants and contracts? _____ %

c. Private foundations? ______ %

d. Industry/corporate funding ______ %

e. Center/institute endowment? ______ %

f. Patient care services? ______ %

g. Direct state funds? ______ %

h. Other sources? ______ %
12. Is your center/institute assigned any physical space?

- [ ] Yes
- [ ] No  (Skip to Question 13)

12a. (If Yes) How many net-assignable square feet is your center/institute currently assigned?

<table>
<thead>
<tr>
<th>Net-Assignable Square Feet</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Lab/research space?</td>
<td>______</td>
</tr>
<tr>
<td>b. Office, Administrative?</td>
<td>______</td>
</tr>
<tr>
<td>c. Office, Clinical?</td>
<td>______</td>
</tr>
<tr>
<td>d. Other?</td>
<td>______</td>
</tr>
<tr>
<td>Total</td>
<td>______</td>
</tr>
</tbody>
</table>

**STAFFING**

We would like to know about the staff members who currently work at your center/institute. Please use the following definitions:

- **Faculty** are those who hold professorial rank (i.e. assistant professor, associate professor, professor).

- **Professional research staff** are those who have similar credentials as faculty but who do not have faculty appointments, often with titles such as research scientist, research associate, research scholar, etc.

- **Postdoctoral appointees** are researchers with short (1- or 2-year) renewable appointments.

- **Other staff** are staff who are not faculty and who do not primarily conduct research, including technicians, administrative staff, and non-faculty clinicians.

13. According to the above definitions, how many of the following personnel currently work at your center/institute?

<table>
<thead>
<tr>
<th>Number of people</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Faculty?</td>
<td>______</td>
</tr>
<tr>
<td>b. Professional staff?</td>
<td>______</td>
</tr>
<tr>
<td>c. Postdoc appointees?</td>
<td>______</td>
</tr>
<tr>
<td>d. Other staff?</td>
<td>______</td>
</tr>
<tr>
<td>(technician, administrative staff, non-faculty clinician)</td>
<td></td>
</tr>
<tr>
<td>e. Graduate students?</td>
<td>______</td>
</tr>
<tr>
<td>f. Medical residents/fellows?</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>______</td>
</tr>
</tbody>
</table>
### FACULTY

14. How many of the following types of faculty currently work at your center/institute? 

<table>
<thead>
<tr>
<th>Type of Faculty</th>
<th>Number of people</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Faculty who receive full salary support from your center/institute funds?</td>
<td>_______</td>
</tr>
<tr>
<td>b. Faculty who receive partial salary support from your center/institute funds?</td>
<td>_______</td>
</tr>
<tr>
<td>c. Faculty who receive no salary support from your center/institute funds?</td>
<td>_______</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>_______</td>
</tr>
</tbody>
</table>

15. How many faculty at your center/institute have primary appointment in each of the following units? 

<table>
<thead>
<tr>
<th>Unit</th>
<th>Number of people</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Your center/institute?</td>
<td>_______</td>
</tr>
<tr>
<td>b. Medical school basic science departments at your university?</td>
<td>_______</td>
</tr>
<tr>
<td>c. Medical school clinical science departments at your university?</td>
<td>_______</td>
</tr>
<tr>
<td>d. Academic departments outside the medical school at your university?</td>
<td>_______</td>
</tr>
<tr>
<td>e. Other centers/institutes at your university?</td>
<td>_______</td>
</tr>
<tr>
<td>f. At another university?</td>
<td>_______</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>_______</td>
</tr>
</tbody>
</table>

16. Please list the names of the academic departments represented by faculty members working at your center/institute.
PROFESSIONAL RESEARCH STAFF

(Reminder: Professional research staff are those who have similar credentials to faculty but who do not have faculty appointments and who are not postdoctoral appointees.)

17. Are your professional research staff generally eligible for: (circle one response for each item)

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Principal investigator status?</td>
<td>Y</td>
</tr>
<tr>
<td>b. Sabbatical leave?</td>
<td>Y</td>
</tr>
<tr>
<td>c. Participation in academic senate?</td>
<td>Y</td>
</tr>
<tr>
<td>d. Participation in school-level or university-level policy committees?</td>
<td>Y</td>
</tr>
<tr>
<td>e. Institutional grievance procedures?</td>
<td>Y</td>
</tr>
</tbody>
</table>

18. What type of appointment policy is generally available to professional research staff?

- Appointment without term
- Multi-year contract
- One-year contract
- Employees-at-will (no contract)

EDUCATION

19. Is your center/institute a sponsor of any degree-granting education programs?

- Yes
- No

20. Does your center/institute participate in any of the following educational activities?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Instruction of undergraduate students?</td>
<td>Y</td>
</tr>
<tr>
<td>b. Instruction or training of medical students?</td>
<td>Y</td>
</tr>
<tr>
<td>c. Instruction or training of graduate students, residents, or fellows?</td>
<td>Y</td>
</tr>
<tr>
<td>d. Student advising?</td>
<td>Y</td>
</tr>
</tbody>
</table>
ABOUT THE DIRECTOR

21. In what year were you appointed to your current position?
   Year: __________

22. Did you work at this center/institute before you became director?
   - Yes
   - No
   - No, I am the founding director

23. In your role as director, to whom do you directly report?
   - Department chairperson
   - Another center/institute director
   - Medical school dean
   - Medical school associate dean for research
   - Graduate school dean
   - Multi-college committee
   - Provost/university vice president
   - President/chancellor of the university or campus
   - Independent board of trustees
   - Other, specify _________________________

24. Was there a search committee for your position as center/institute director?
   - Yes
   - No (Skip to Question 25)

24a. (If Yes) The search committee primarily consisted of: (check one only)
   - Administrators
   - Faculty members
   - Combination of administrators and faculty members
   - Other, specify _________________________________
25. What is the duration of your directorship?
   - Not clearly defined
   - Indefinite
   - Fixed term, non-renewable (Length of term: ______ years)
   - Fixed term, renewable (Length of term: ______ years)
   - Other, specify ___________________________________________

26. Do you have a faculty appointment?
   - Yes
   - No (Skip to Question 27)

26a. (If Yes) What is your current academic rank?
   - Professor
   - Associate professor
   - Assistant professor
   - Other, specify ___________________________________________

26b. (If Yes) What is your tenure status?
   - Tenured
   - Tenure track
   - Non-tenure track, tenure is available at the university
   - Non-tenure track, tenure is not available at the university

27. In addition to your directorship, do you currently serve as: (circle one response for each item)

<table>
<thead>
<tr>
<th>Item</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Academic department chair?</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>b. Associate dean?</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>c. Hospital department chief?</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>d. Director of another center/institute?</td>
<td>Y</td>
<td>N</td>
</tr>
</tbody>
</table>
**OPINION**

Please mark the level of your agreement or disagreement with the following statements:

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>28. Centers/institutes at my institution are essential to the fulfillment of the university’s mission.</td>
<td>SA</td>
<td>A</td>
<td>N</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>29. Interdisciplinary research centers/institutes will be more important in 10 years than today.</td>
<td>SA</td>
<td>A</td>
<td>N</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>30. In the future, there will be more research centers/institutes created in my institution.</td>
<td>SA</td>
<td>A</td>
<td>N</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>31. Research centers/institutes will eventually replace traditional academic departments.</td>
<td>SA</td>
<td>A</td>
<td>N</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>32. Centers/institutes have more power than academic departments in institutional governance.</td>
<td>SA</td>
<td>A</td>
<td>N</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>33. Centers/institutes at my university are adequately represented in institutional governance.</td>
<td>SA</td>
<td>A</td>
<td>N</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>34. Faculty at my center/institute play a significant role in the center/institute’s decision-making.</td>
<td>SA</td>
<td>A</td>
<td>N</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>35. Appointment in research centers/institutes hinders the advancement of junior faculty members.</td>
<td>SA</td>
<td>A</td>
<td>N</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>36. The university has adequate policies to promote and retain non-faculty professional research staff at my center/institute.</td>
<td>SA</td>
<td>A</td>
<td>N</td>
<td>D</td>
<td>SD</td>
</tr>
<tr>
<td>37. My center/institute is successful in recruiting the personnel we need.</td>
<td>SA</td>
<td>A</td>
<td>N</td>
<td>D</td>
<td>SD</td>
</tr>
</tbody>
</table>
APPENDIX D:  
AAMC Project on Centers and Institutes

Board of Consultants

Haile T. Debas, M.D.
Executive Director, Global Health Sciences, and Dean Emeritus,
University of California, San Francisco School of Medicine

Michael J. Friedlander, Ph.D.
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Civitan International Research Center,
University of Alabama School of Medicine

Roger L. Geiger, Ph.D.
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Pennsylvania State University

Stanley O. Ikenberry, Ph.D.
Regent Professor and President Emeritus,
University of Illinois

David Korn, M.D.
Senior Vice President for Biomedical and Health Sciences Research,
AAMC

Lisa Staiano-Coico, Ph.D.
Rebecca Q. and James C. Morgan Dean, College of Human Ecology,
Cornell University
References


