Looking a Gift Horse in the Mouth

Corporate Gifts Supporting Life Sciences Research

Eric G. Campbell, PhD; Karen Seashore Louis, PhD; David Blumenthal, MD, MPP

Context.—Throughout the last decade a number of studies have been conducted to examine academic-industry research relationships. However, to our knowledge, no studies to date have empirically examined academic scientists’ experience with research-related gifts from companies.

Objective.—To examine the frequency, importance, and potential implications of research-related gifts from companies to academic life scientists.

Design.—A mailed survey conducted in 1994 and 1995 of 3394 faculty who conduct life science research at the 50 universities that received the most research funding from the National Institutes of Health in 1993.

Setting.—Research-intensive universities.

Participants.—A total of 2167 of the 3394 faculty responded to the survey (response rate, 64%).

Main Outcome Measures.—The percentage of faculty who received a research-related gift from a company in the last 3 years, the perceived importance of gifts to respondents’ research, and what, if anything, the recipient thought the donor(s) expected in return for the gift.

Results.—Forty-three percent of respondents received a research-related gift in the last 3 years independent of a grant or contract. The most frequently received gifts were biomaterials (24%), discretionary funds (15%), research equipment and trips to meetings (11% each), support for students (9%), and other research-related gifts (3%). Of those who received a gift, 66% reported the gift was important to their research. More than half of the recipients reported that donors expected the following in return for the gift: acknowledgment in publications (63%), that the gift not be passed on to a third party (60%), and that the gift be used only for the agreed-on purposes (59%). A total of 32% of recipients reported that the donor wanted prepublication review of any articles or reports stemming from the use of the gift, 30% indicated that the company expected testing of their products, and 19% indicated that a donor expected ownership of all patentable results from the research in which a gift was used. However, what recipients thought donors expected differed by the type of gift received.

Conclusions.—Research-related gifts are a common and important form of research support for academic life scientists. However, recipients frequently think that donors place restrictions and expect returns that may be problematic for recipients as well as institutions.

Context.—Throughout the last decade there have been a number of studies of academic-industry research relationships (AIRRs) that have focused on corporate support of research in the form of grants or contracts.1-4 However, these studies have not examined a less formal method of resource exchange between companies and academic scientists—research-related gifts. These gifts can be in the form of discretionary funds, biomaterials, support for students, research equipment, or trips to professional meetings.5,6

Unlike other AIRRs, gifts are rarely subjected to significant oversight by the university. This is partly because gifts are given to individuals without an institutionally negotiated research grant or contract. In addition, because gifts are believed to be given with innocuous restrictions, many recipients assume they do not require significant university oversight.

Nevertheless, anecdotal evidence suggests that research-related gifts may come with problematic restrictions and expectations that may justify more active university management of these relationships. For example, accepting gifts may obligate recipients to keep results of their research confidential or provide donors with prepublication review that may significantly delay publication. In other cases donors may expect recipients to turn over all ownership rights of patentable results that arise from use of a gift.7,8

Because no systematic data have been collected to address this issue, the extent, characteristics, and implications of these exchanges have been difficult to judge. In this article we begin to explore these issues by examining the following questions: (1) How prevalent in major universities are research-related gifts? (2) How important are these gifts to faculty members’ research? (3) What characteristics exemplify faculty who are likely to receive research-related gifts? (4) What, if anything, do donors expect in return for a research gift?

Answers to these questions will inform university policymakers regarding the extent and potential consequences of gift relationships for faculty and their institutions.

METHODS

Sample

The data used in this study were derived from a survey of a stratified, random sample of 4000 life science faculty conducted between October 1994 and April 1995. This sample was selected by identifying the 50 universities that received the most research funding from the National Institutes of Health in 1993. Then, using medical school catalogs and Peterson’s Guide to Graduate Programs in the Biological and Agricultural Sciences,10 we identified all life science departments and graduate programs at these institutions. Departments were
classified as “clinical” or “nonclinical” depending on whether their names referred to a clinical discipline (eg, anesthesiology, medicine, or surgery) or a nonclinical discipline (eg, biochemistry, molecular biology, genetics, or chemistry). From each institution, we randomly selected 1 department of medicine (internal medicine or other medicine subspecialties), 1 additional clinical department (eg, surgery, anesthesiology, or pathology), and 2 nonclinical departments. Departments of medicine, internal medicine, and medicine subspecialties were oversampled with respect to the nonmedicine specialties (surgery, pathology, etc) because they often receive the majority of extramural research funds at academic health centers.11

After identifying members of the selected departments, we constructed our mailing sample so that half was drawn from clinical departments and half from nonclinical departments. To avoid including individuals who were not truly functioning as faculty (eg, pure clinicians, residents, fellows, and hospital staff), we included only those clinical faculty who had published at least 1 article listed in the National Library of Medicine’s MEDLINE database in the 5 years preceding the study. We also included all faculty who were identified by the National Center for Human Genome Research as recipients of funding from the Human Genome Project (HGP).1 This process yielded a final sample of 1871 clinical faculty, 1871 nonclinical faculty, and 258 HGP recipients.

Survey Design and Administration

The survey instrument was a modified version of a questionnaire administered in 1985 to 1238 faculty concerning their relationships with industry.2 The survey was conducted by mail and administered by the Center for Survey Research at the University of Massachusetts, Boston. Of the 4000 faculty in our mailing sample, 606 were ineligible because they were duplicate listings, were deceased or retired, held no faculty appointment at the sampled university, or could not be located. To determine how respondents differed from nonrespondents, the survey firm conducted a brief follow-up telephone survey of 124 nonrespondents. We asked nonrespondents about their academic rank and whether they had any extramural research funding. Nonrespondents were significantly more likely to have untenured track or junior appointments (eg, lecturer, instructor), and they were significantly less likely to have any extramural research support. Of the remaining eligible 3394 faculty, 927 (63%) of the clinical faculty, 1125 (67%) of the nonclinical faculty, and 115 (51%) of the recipients of HGP funding returned completed questionnaires, yielding a total of 2167 completed surveys and an overall response rate of 64% after 3 survey mailings.

Important Variables

Gift Variables.—In order to measure the frequency and importance of research-related gifts we asked faculty, “In the last 3 years have you received any of the following gifts (independent of a research grant or contract) from industry to support your research? (Check all that apply.)” The response categories were “equipment,” “biomaterials (reagents, clones, antibodies, tissues, cell lines),” “disciplinary funds,” “support for students,” “trips to professional meetings,” “other (please describe),” and “none of the above.” We then asked, “How important were these gifts to the progress of your research?” The response categories were “essential,” “very important,” “important,” “not very important,” and “not at all important.”

To measure the extent and nature of restrictions and expectations of return associated with gifts we asked, “Do you think the company (or companies) expected any of the following in return for the gift(s)? (Check yes or no for each.)” The follow-up statements were as follows: “use only for the agreed-upon purposes,” “acknowledgment in publications,” “prepublication review of articles or reports,” “coauthorship on papers,” “the gift not be used for commercial applications,” “the gift not be used for applications that compete with company products,” “the gift not be passed on to third parties,” “ownership of all patentable results of the gift,” “a future consulting relationship between you and the company,” “general access to faculty and graduate students,” “recruitment of graduate students,” “evaluation testing of company products,” “training of company employees,” and “other (please explain).” It is important to note that this item measured what recipients thought companies expected in return for a gift, not necessarily what requirements they actually experienced.

Classifying Faculty by Research Type.—Since membership in a clinical or nonclinical department may not fully predict whether faculty conduct clinical or nonclinical research, we classified faculty based on their responses to 2 survey items: “In the last 3 years, has any of your university research consisted of clinical trials of drugs, devices, or other diagnostic or therapeutic technologies?” and “In the last 3 years, has any of your university research, other than clinical trials, required approval of a human subjects committee?” Those faculty who responded affirmatively to either question were classified as clinical researchers. Faculty who indicated that they did not conduct any of these types of research within the last 3 years were classified as preclinical researchers.

Analysis

In addition to tabulating responses, we used simple and multiple regression analysis to test differences in means. Differences in simple proportions were tested using χ² analysis. Differences in proportions involving multiple variables were tested using logistic regression analysis.

We conducted several analyses to distinguish the effects of receiving gifts of different types. For clarity, these analyses involve only faculty who received a single type of gift (eg, biomaterials alone), since it would be impossible to relate a restriction or expectation of return to a particular class of gift where faculty received more than 1 type.

RESULTS

Table 1 shows that in the last 3 years, 43% of respondents (920 faculty) received a gift from industry (independent of a grant or contract) to support their research. The most frequently received type of gift was biomaterials (24% of respondents), followed by discretionary funds (15%), equipment and trips to professional meetings (11% each), support for students (9%), and other (3%).

Among the 920 gift recipients, 459 (49.9%) received a single type of gift and 461 (51.1%) received more than 1 type of gift. Of those who received a single type of gift, 64 (14%) received only equipment, 252 (55%) received only biomaterials, 77 (17%) received only discretionary funds, and 66 (14%) received only trips. No respondents reported receiving support for students or other gifts alone.

Although not shown in Table 1, we found no significant difference in the percentage of faculty in each subsample who received a research-related gift. Forty-four percent of faculty in clinical departments received a gift compared with 42% of faculty in nonclinical departments and 47% of recipients of HGP funding (P = .42).

Males were significantly more likely than females to receive an industrial gift (45% vs 35%, P < .001). Also, senior faculty were more likely to receive gifts than junior faculty. Forty-eight percent of full professors received a gift compared with 41% of associate professors, 38% of assistant professors, and 29% of other faculty (P < .001). Half of the clinical researchers received a research-related gift compared with 36% of the preclinical researchers (P < .001). Also, faculty who had research grants and contracts from industry were more likely to receive re-

©1998 American Medical Association. All rights reserved.
search-related gifts than those without grants or contracts (70% vs 93%, \(P < .001\)).

### Importance of Gifts

In terms of the perceived importance of these gifts to respondents’ research, 13% of recipients reported that gifts from industry were “essential,” 22% reported “very important,” 31% reported “important,” 25% reported “not very important,” and 9% reported that the gifts were “not at all important” to the progress of their research. Gifts were perceived as significantly more important by preclinical researchers than clinical researchers. Seventy-one percent of preclinical researchers than clinical researchers. Seventy-one percent of preclinical researchers than clinical researchers rated these gifts as “essential,” “very important,” “important,” or “essential” to their research compared with 64% of clinical researchers \((P = .02)\). The importance of gifts varied by type of gift received (Figure). Twenty-four percent of those who received only trips rated them as “essential,” “very important,” or “important” to the progress of their research. However, 75% of those who received only biomaterials, 66% of those who received only discretionary funds, and 67% of those who received only research equipment rated these gifts as “essential,” “very important,” or “important” to the progress of their research \((P < .001)\).

### Academic and Commercial Activities

On all of the dimensions measured, faculty who received gifts were significantly more productive than nonrecipients (Table 2). Faculty who received research-related gifts published significantly more articles in refereed journals in the last 3 years, had significantly more hours of student contact, and engaged in significantly more service activities than faculty who did not receive research-related gifts. These results remained even when controlling for differences due to the effects of sex, academic rank, total research funding, clinical research, and whether the respondent had any research grants or contracts from industry. There were no significant differences in the number of publications, the number of hours of student contact, or the number of service roles by type of gift received (results not shown).

Table 3 shows the commercial outcomes of research ranging from the most preliminary (applying for a patent) to the most commercially advanced (such as having a product on the market or a startup company). On all measures, faculty who received research-related gifts were significantly more commercially productive than nonrecipients. These results remained when controlling for the effects of sex, academic rank, total research funding, type of researcher (clinical vs preclinical), whether respondents had any research grants or contracts from industry, and whether respondents had any research grants or contracts from industry. Means are unadjusted.

### Restrictions and Returns Associated With Gifts

More than half of all recipients thought that donors expected acknowledgment in publications (63%), that the gift not be passed on to a third party (60%), or that the gift not be used for commercial applications that compete with company products (30%). Twenty percent of recipients thought that donors expected that the gift not be used for commercial applications that compete with company products (29%). Twenty percent of recipients thought that donors expected the gift not be used for commercial applications that compete with company products (29%).

The importance of gifts to the progress of recipients’ research by type of gift. Percentages were calculated using the 459 recipients who received only 1 type of gift. Support for students is not shown because no respondent received this gift alone. Percentages do not add up to 100 in all cases because of rounding.

### Table 1.—Frequency of Research-Related Gifts From Industry

<table>
<thead>
<tr>
<th>Type of Gift</th>
<th>Faculty Who Received a Gift, No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment</td>
<td>235 (11)</td>
</tr>
<tr>
<td>Biomaterials (reagents, clones, antibodies, tissues, cell lines, etc)</td>
<td>502 (24)</td>
</tr>
<tr>
<td>Discretionary funds</td>
<td>315 (15)</td>
</tr>
<tr>
<td>Support for students</td>
<td>186 (9)</td>
</tr>
<tr>
<td>Trips to professional meetings</td>
<td>234 (11)</td>
</tr>
<tr>
<td>Other</td>
<td>59 (3)</td>
</tr>
<tr>
<td>Received any of the above gifts</td>
<td>920 (43)</td>
</tr>
</tbody>
</table>

*This table refers to the number and percentage of respondents who received each type of gift. Because faculty could receive multiple gifts, the number of recipients does not total 100% and the percentages do not add up to 100. The percentages were calculated by dividing the number of recipients by the number of respondents who answered this item (2128) and multiplying the result by 100.

### Table 2.—Selected Measures of Faculty Academic Activity

<table>
<thead>
<tr>
<th>Received a Gift</th>
<th>No. of Publications in Last 3 y</th>
<th>Hours of Student Contact per Week</th>
<th>No. of Service Activities†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Mean (SD) P Value</td>
<td>Mean (SD) P Value</td>
<td>Mean (SD) P Value</td>
</tr>
<tr>
<td>14.0 (9.7)</td>
<td>.002</td>
<td>18.0 (14.2)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>No</td>
<td>10.1 (12.2)</td>
<td>15.7 (12.6)</td>
<td>2.2 (1.8)</td>
</tr>
</tbody>
</table>

* Differences in means were tested using multiple regression analysis controlling for the effects due to sex, academic rank, total research funding, faculty type (clinical or preclinical researcher), and whether respondents had any research grants or contracts from industry. Means are unadjusted.

†Service indicates the number of service roles faculty held (department chair, university-wide administrator, member of a study section or review panel, editor on the editorial board of a journal, head of a research institute, chair of a university-wide committee, officer of a professional association, or member of the board or review panel of a foundation).

Looking a Gift Horse in the Mouth—Campbell et al JAMA, April 1, 1998—Vol 279, No. 13 ©1998 American Medical Association. All rights reserved.
party (40%). Among those who received only biomaterials, more than three fourths thought that the company expected that the biomaterial not be passed on to a third party (82%), that it not be used for commercial application (81%), that it be used only for the agreed-on purpose (78%), and that the company be acknowledged in publications (79%). Other frequent restrictions and expectations of returns recipients thought were associated with gifts of biomaterials were that the biomaterial not be used for applications that compete with company products (44%), that the firm receive prepublication review of articles or reports (40%), and that the company have ownership of all patentable results from the gift (32%). Among those who received discretionary funds, 41% believed that the company expected that the money be used for the agreed-on purpose, 39% that the company be acknowledged in publications, and 36% that the funds not be passed on to a third party. For those faculty who received only trips to meetings, the most frequently reported restrictions and expectations of returns were that the trips be used for the agreed-on purpose (50%) and that the trip not be taken by a third party (32%).

**COMMENT**

Corporate gifts are a common source of research-related resources for life scientists. Almost half of all life scientists surveyed (45%) received a gift from a company (independent of a research grant or contract), suggesting that industrial philanthropic behavior may influence a large number of life scientists. The extent of this influence may be considerable given that 66% of all recipients reported that gifts were either “important,” “very important,” or “essential” to the progress of their research. However, other restrictions that may be perfectly legitimate from a donor’s perspective may create ethical dilemmas for recipients. Our data suggest that this is especially true of restrictions on biomaterials. While it is accepted practice for academic scientists to seek access to reagents from the acknowledged source, such a restriction may be problematic to the extent that a firm refuses to give biomaterials to other researchers interested in replicating or extending the author’s research or prohibits authors from depositing it in a biomaterial bank as required by several leading journals.

Restrictions regarding a period of prepublication review present similar issues. For firms, prepublication review is a legitimate way to provide feedback on new or improved uses of a firm’s biomaterial and at the same time necessary to protect its lead over competitors. As a result, academic scientists may experience delays in publication, which may be detrimental to the overall progress of research, especially in rapidly developing fields.

**Academic and Commercial Activities**

The data presented herein suggest that gifts from industry are related to high levels of academic and commercial activities. There are several possible explanations for this finding. It may be that firms selectively provide gifts to faculty who are highly academically and commercially productive prior to receiving a gift. However, gifts may also enhance academic and commercial productivity by providing resources or exposing recipients to new perspectives on their research. Also, it may be that more commercially inclined or entrepreneurial faculty are more likely to solicit gifts from companies. Unfortunately, the design of the study does not allow us to examine these issues.

**Table 4.—Recipients Who Reported Restrictions and Returns by Type of Gift Received**

<table>
<thead>
<tr>
<th>Restrictions and Returns</th>
<th>Equipment Only, % (n=64)</th>
<th>Biomaterials Only, % (n=254)</th>
<th>Discretionary Funds Only, % (n=77)</th>
<th>Trips Only, % (n=66)</th>
<th>P Value‡</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use only for the agreed-on purpose(s)</td>
<td>24</td>
<td>78</td>
<td>41</td>
<td>50</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Acknowledgment in publications</td>
<td>60</td>
<td>79</td>
<td>39</td>
<td>26</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Prepublication review of articles or reports</td>
<td>13</td>
<td>40</td>
<td>20</td>
<td>18</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Coauthorship on reports or publications</td>
<td>2</td>
<td>17</td>
<td>8</td>
<td>3</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Not to be used for any commercial application</td>
<td>20</td>
<td>81</td>
<td>14</td>
<td>14</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Not to be used for applications that compete with company products</td>
<td>13</td>
<td>44</td>
<td>16</td>
<td>10</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Not to be passed on to third parties</td>
<td>40</td>
<td>82</td>
<td>35</td>
<td>32</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Ownership of all patentable results from the gift</td>
<td>5</td>
<td>32</td>
<td>14</td>
<td>7</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Future consulting relationship between recipient and company</td>
<td>24</td>
<td>9</td>
<td>22</td>
<td>24</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>General access to university faculty and graduate students</td>
<td>13</td>
<td>4</td>
<td>10</td>
<td>10</td>
<td>.04</td>
</tr>
<tr>
<td>Recruitment of graduate students</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>.85</td>
</tr>
<tr>
<td>Evaluation and testing of company products</td>
<td>49</td>
<td>19</td>
<td>25</td>
<td>15</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Training of company employees</td>
<td>5</td>
<td>1</td>
<td>10</td>
<td>7</td>
<td>.005</td>
</tr>
<tr>
<td>Other</td>
<td>5</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>.05</td>
</tr>
</tbody>
</table>

*In this table the numbers vary slightly among questions because of missing data: not all respondents answered all questions. The percentage of respondents who answered given questions affirmatively are represented.

†P values were calculated using χ² testing.

©1998 American Medical Association. All rights reserved.
fields. The extent to which a period of prepublication review is problematic depends primarily on the length of time that research data are withheld from the academic community. This finding is certain cause for some concern, given that a recent study found that delays of more than 6 months were associated with industrial support of research and 70% of all gift recipients had received research funding from industry.

Our data also indicate that accepting gifts that are encumbered with restrictions regarding the ownership of patentable materials may place recipients at odds with university policies regarding intellectual property ownership. For example, we found that 92% of those who received only biomaterials thought that the donor expected ownership of all patentable results stemming from use of the gift. By accepting a gift with this restriction, without an institutionally negotiated grant or contract, faculty may be knowingly or unknowingly violating the technology transfer policies of their university.

Finally, our data suggest that industry, faculty, or both may be using the gift mechanism as a way to bypass institutional administrative structures designed to manage AIRRs. This may be most applicable to the 15% of respondents who received discretionary funds to support their research. By receiving money earmarked to support research in the form of a gift, rather than as an institutionally negotiated research grant or contract, faculty essentially fail to reimburse their university for overhead expenses, which is also likely to violate existing institutional policies.

Policy Implications

Problematic Restrictions and Expectations of Returns.—Although there are no universally accepted rules defining a problematic restriction or expectation of return, this research suggests a set of general guidelines concerning corporate gifts. First, faculty should become familiar, if they are not already, with their institutional policies that govern gifts vs grants and contracts. Second, if existing policies regarding gifts are inadequate, academic institutions should develop through faculty new or revised policies that simultaneously encourage the sharing of results and timely dissemination of results to the academic community and at the same time protect the legitimate interests of donors. Third, faculty should not accept any resources from a firm that expects ownership of intellectual property without an institutionally negotiated research grant or contract. Fourth, faculty bear the primary responsibility to avoid using the gift mechanism as a means to bypass existing institutional policies and administrative structures for exchanges that are more appropriately managed under the auspices of a research grant or contract.

University Regulation of Gift Relationships.—Based on the data presented herein, prohibiting or heavily regulating the acceptance of direct gifts by faculty members to support their research is not warranted. Such steps may deprive researchers of resources that clearly play an important role in life sciences research and are likely to be beneficial to the advancement of scientific knowledge and its applications. However, the data do suggest that universities need to be aware of research-related gifts and monitor specific cases where expectations of return clearly pose problems for the recipient or the institution.

Limitations and Future Studies

This study has several limitations that must be considered. First, we did not attempt to verify the accuracy of recipients’ perceptions of the restrictions or expectations of return associated with research-related gifts, nor did we measure whether faculty honored donors’ wishes. We also have no way of knowing if or to what extent recipients’ perceptions of the restrictions and expectations of return differed from that of the donors.

Second, we examined only one kind of gift—support for individual faculty research. Gifts to institutions such as new buildings or endowed chairs may have an entirely different character than those discussed here and, therefore, these findings may not be applicable to such forms of gifts. Also, because we studied life science faculty in the 50 most research-intensive universities, these findings may not be generalizable to less research-intensive institutions.

Third, as mentioned in the “Analysis” section, because of the way the questionnaire was designed, we could analyze the effects of individual types of gifts for only a subsample of all gift recipients. The importance and expectations of return for those faculty who received multiple types of gifts may differ from those who received only 1 type of gift.

Fourth, we recognize that inferences related to the propriety receiving of research-related gifts are often subtle and situation specific and are best made on a case-by-case basis. Restrictions that appear worrisome when reported on a questionnaire may not be so in actual practice. At a minimum, expectations associated with research-related gifts deserve significantly more study and discussion in the academic community. For example, further studies should directly ask donors (in addition to recipients) what, if any, restrictions and expectations of return are associated with research-related gifts. Future studies should also examine the extent of faculty compliance with restrictions and expectations of return. Studies should investigate the effects of gifts on graduate student’s and faculty members’ attitudes and behaviors regarding data sharing and data withholding.

Despite these limitations, this research shows that gifts from industry to life scientists are a common and important form of academic-industrial research relationship and that at times it may be prudent for faculty members to “look a gift horse in the mouth.”

This work was supported by grant HG00724-01 from the National Center for Research of the National Institutes of Health, the National Science Foundation, and the Commonwealth Fund Task Force on Academic Health Centers. The authors wish to acknowledge the contributions of Melissa S. Anderson, PhD, at the University of Minnesota, Nancyanne Cauzino, EdD, and Joel S. Weissman at the Health Policy Research and Development Unit of the Massachusetts General Hospital, and Terra Zyporin, our editorial consultant.

References

4. Blumenthal D, Campbell E, Anderson M, Weissman at the Health Policy Research and Development Unit of the National Institutes of Health, the National Science Foundation, and the Commonwealth Fund Task Force on Academic Health Centers.