An Adaptive Approach to Facilitating Research Productivity in a Primary Care Clinical Department

Anne Marie Weber-Main, PhD, Deborah A. Finstad, Bruce A. Center, PhD, and Carole J. Bland, PhD

Abstract

Efforts to foster the growth of a department's or school's research mission can be informed by known correlates of research productivity, but the specific strategies to be adopted will be highly context-dependent, influenced by local, national, and discipline-specific needs and resources. The authors describe a multifaceted approach—informed by a working model of organizational research productivity—by which the University of Minnesota Department of Family Medicine and Community Health (Twin Cities campus) successfully increased its collective research productivity during a 10-year period (1997–2007) and maintained these increases over time.

Facing barriers to recruitment of faculty investigators, the department focused instead on nurturing high-potential investigators among their current faculty via a new, centrally coordinated research program, with provision of training, protected time, technical resources, mentoring, and a scholarly culture to support faculty research productivity. Success of these initiatives is documented by the following: substantial increases in the department's external research funding, rise to a sustained top-five ranking based on National Institutes of Health funding to U.S. family medicine departments, later-stage growth in the faculty's publishing record, increased research capacity among the faculty, and a definitive maturation of the department's research mission. The authors offer their perspectives on three apparent drivers of success with broad applicability—namely, effective leadership, systemic culture change, and the self-awareness to adapt to changes in the local, institutional, and national research environment.

Research is a core mission of academic medicine but faces numerous well-recognized challenges. Fiscally, research in academic health centers (AHCs) is challenged by reductions in clinical reimbursement, the rising costs and flattening of the National Institutes of Health (NIH) budget. Culturally, the rapidly expanding need for interdisciplinary research is at odds with academia's slow adoption of a culture that tangibly values team science. Capacity-wise, the vitality of the physician scientist pipeline is a major concern, with U.S. medical schools finding it difficult to recruit and retain physician faculty, particularly in patient-oriented research.

Daunting challenges such as these require a coordinated response from multiple stakeholders. Nationally, for example, new career development programs have emerged to enrich the research pipeline. Institutions in the NIH's Clinical and Translational Science Awards Program are developing informatics tools to facilitate the oftentimes complex tasks of research collaboration, recruitment, and management. And two culture-shifting policy trends have been observed in medical schools: (1) changes in appointment and tenure policies to better recognize interdisciplinary research, and (2) recognition of educational scholarship via new promotion criteria for clinician educators. But even as efforts advance nationally, a pressing question remains: What strategies can individual medical schools or departments employ to reach, and ultimately sustain, a desired level of research excellence?

A literature-based model of research-productive organizations (Figure 1), developed and refined over time by Bland and colleagues, illustrates that optimal productivity depends on factors within three domains: (1) characteristics of the individual researcher, (2) features of the environment where the research is being conducted, and (3) attributes of the organization's leaders. Initial testing of the Bland model suggests it is the dynamic interplay of multiple factors that determines research productivity.

Although knowledge about research productivity correlates is useful, translating that knowledge into practice is more nuanced. First, each factor in the model can be addressed by any number of diverse strategies (e.g., recruitment of well-trained and accomplished researchers, investments in research-intensive training programs, research support services, faculty development activities, stimulus funding for research, and research productivity incentives). Second, although devoting attention to multiple factors in the model is ideal, organizations have limited resources. Reports from academic health settings that launched comprehensive approaches to facilitate research make one point clear: Efforts to enhance...
research can take many paths and are highly context-dependent. Leaders must make strategic investments in research, informed by an assessment of local needs and environmental conditions likely to influence success. This reality highlights a need to communicate successful approaches for facilitating research productivity across different contexts.

In this article, we document a particularly influential period of research growth for our primary care clinical department, the Department of Family Medicine and Community Health (DFMCH) at the University of Minnesota (Twin Cities campus). Through coordinated strategies that span multiple domains of the Bland model, we achieved substantial gains in our faculty’s collective research productivity during a 10-year period (1997–2007). This account of our methods, outcomes, and perspectives offers insight to leaders in academic medicine, with particular salience for departments or schools that are less research-intensive. To facilitate applicability of our experience to other settings, we describe contextual factors that influenced not only our initial selection of research–facilitating strategies but also our adaptation of these strategies over time. The importance of context, self-assessment, and refinement of approaches is an important theme of this article.

Initial Context for Change

In the late 1990s, recognition of a national need to develop more clinical researchers and physician scientists emerged. Specifically among family medicine physicians, low rates of article publication and grant acquisition prompted calls for the discipline to identify a shared research agenda and increase its scholarly capacity. Yet few family medicine departments had the environment needed to develop a research-intensive mission. Within academic medicine as a whole, U.S. medical schools faced financial shortfalls from reductions in patient referrals and in federal funding for medical education. We felt these effects acutely at our university, where we were adapting to Minnesota’s low rates of Medicare reimbursement and nearly complete penetration of managed care—a feature associated with declines in NIH dollars acquired by affected medical schools and declines in institutional dollars allocated to research. To confront these challenges, our dean articulated a strategic focus on two of our medical school’s strengths: outstanding education of health professionals and excellence in research.

In this context, our department faced the significant challenge of better aligning with the nation’s and our home institution’s research priorities. Realignment required a major refinement of our founding mission. The DFMCH was created in 1970 in response to a legislative mandate to train primary care physicians, and so far over 1,400 family medicine physicians have graduated from our residency programs. Our medical
school is consistently ranked among the top 10 nationally to produce students entering family medicine residencies. From 1974 to 2005, 65% of our residency graduates went on to practice primary care in Minnesota.

In contrast, our past research activities were exceedingly modest (though on par with other family medicine departments). In 1997, the DFMCH faculty had 68 full-time members, but only 6.6 FTE of the faculty’s time was spent in research activities. Our investigators received a mere five grants that year. Less than a quarter of our full-time faculty members were tenured or on the tenure track. The remainder held positions as academic professional staff with courtesy faculty titles—an appointment suitable for clinical care and residency teaching roles, but which carried no expectations for research. Clearly, efforts to strengthen our research mission would require unprecedented changes in our culture and resource allocation.

Selection of Strategies to Facilitate Research

Faced with an exigency to become more research-productive, we turned to the Bland model. As part of a 1996–1997 strategic planning process, we surveyed our faculty to identify features of highly research-productive organizations that were absent, or required strengthening, in our department. The results were compelling. Although most DFMCH physician faculty members (80%) spent little time in research (0%–20% time), nearly all wanted to increase this allocation. A high proportion of the faculty desired research mentoring (70%), research training (with 40% interested in formal course work), and assistance in study design, data analysis, and results dissemination (range = 49%–79% for each area). These results echoed qualitative findings from a faculty retreat and focus groups. Overall, the faculty called for a leadership-driven, department-wide commitment to research and for new programs and personnel to support them in becoming more productive investigators.

One approach to increasing an organization’s research productivity is to recruit successful midcareer or senior investigators. We did not pursue this strategy, in part because of the long-term financial investment required for new tenure-track positions, and realistic concerns about recruitment success given the limited pool of accomplished researchers in family medicine. Moreover, hiring alone would not attend to the much-needed development of our existing faculty. Instead, we focused on nurturing high-potential investigators among the current faculty via a new, centrally coordinated research program that provided training, technical resources, and activities aimed at building a scholarly culture.

To help fund our initiatives, we leveraged federal grant opportunities focused on increasing primary care research. From 1997 through 2006, the DFMCH had continuous funding (average of $248,000 per year across nine years) from the Health Resources and Services Administration (HRSA). At that time, the Title VII Administrative Units program put special emphasis on enhancing the research infrastructure of academic primary care departments. Although HRSA funds were restricted from supporting protected research time for individuals, we applied them to enhance our research infrastructure in other ways, including partial salary support for a research director, a shared technical support core, and activities of research priority teams. In the next section, we describe these and our other approaches to facilitating research, which cover multiple domains of the Bland research productivity model (Table 1). We then summarize our department’s research-related outcomes across 10 years of implementation. We conclude by spotlighting three factors—sustained leadership, culture building, and responsive adaptation of approaches—that we believe had a particularly powerful impact on the growth of our research mission.

Initial Strategies

Establish a clear research emphasis

We began by redefining the department’s mission to put research on equal standing with education and patient care. In addition to codifying “preeminence in family medicine scholarship” in our mission statement, we operationalized this emphasis by establishing a departmental research program as a major administrative unit—one comparable in standing to our graduate and undergraduate education programs. A 0.50 FTE research director was identified through a formal internal search process and granted membership on the DFMCH leadership team. The director worked with a 0.30 FTE associate director and council of senior advisors, composed of six tenured faculty members with active research programs and two senior faculty members external to the department. This leadership team established research policy, mentored other faculty, and implemented new program initiatives.

Provide resources

Our needs assessment indicated that provision of technical resources for research was a priority. We applied HRSA and department funds to assemble a team of existing staff and new hires with expertise in literature and funding opportunity searches, study design and statistical analysis, data entry, database management, proposal and manuscript writing, and poster/presentation development. The team included one or two research assistants who were temporarily assigned to faculty members’ projects. New hires included a 1.0 FTE research writer/editor (PhD in educational psychology, emphasis in experimental design and statistics). Both consulted one-on-one with the faculty and lectured in a research overview course.

Although some of these services had been available previously, the research program expanded and integrated them, with access managed by the director and associate director. Several features made these resources particularly useful. First, the team supported investigators across the research spectrum (idea inception, study design, grant acquisition, results dissemination). Second, because staff were centrally supported and managed, they were available to a large cohort of faculty, including those without grant funding or engaged in short-term projects. Third, staff were housed together, allowing for efficient collaboration among team members and one-stop access for faculty members. Fourth, staff were acculturated to the academic environment and committed to the department’s research mission; they understood that their success would
Table 1
Principal Strategies for Building Research Capacity in the Department of Family Medicine and Community Health, University of Minnesota (Twin Cities Campus), 1997–2007

<table>
<thead>
<tr>
<th>Category</th>
<th>Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Institutional</strong></td>
<td></td>
</tr>
<tr>
<td>Research emphasis</td>
<td>• Redefine department mission to elevate importance of research</td>
</tr>
<tr>
<td></td>
<td>• Establish formal research program</td>
</tr>
<tr>
<td></td>
<td>• Recruit internal senior researcher to lead research program</td>
</tr>
<tr>
<td>Resources</td>
<td>• Establish integrated support team for literature searches, study design, data management/analysis, scientific writing</td>
</tr>
<tr>
<td>Brokered opportunities</td>
<td>• Facilitate transfer of eligible faculty into more research-intensive faculty tracks</td>
</tr>
<tr>
<td>Mentoring</td>
<td>• Establish formal mentoring program for junior faculty in research-linked tracks</td>
</tr>
<tr>
<td>Clear, coordinating goals</td>
<td>• Identify and support research priority areas (e.g., women's health, preventive medicine, sexual health, health disparities)</td>
</tr>
<tr>
<td>Rewards</td>
<td>• Align merit-based rewards with achievement of research goals</td>
</tr>
<tr>
<td>Culture and climate</td>
<td>• Hold quarterly meetings of research faculty</td>
</tr>
<tr>
<td></td>
<td>• Conduct scholarly writing workshops</td>
</tr>
<tr>
<td><strong>Individual</strong></td>
<td></td>
</tr>
<tr>
<td>Socialization, motivation, content knowledge, research skills, simultaneous projects, autonomy and commitment, orientation, work habits</td>
<td>• Launch internal faculty scholars program with protected research time and training (1997–2000)</td>
</tr>
<tr>
<td></td>
<td>• Administer fellowship program to train family medicine physicians for research careers (2001–2008)</td>
</tr>
<tr>
<td></td>
<td>• Assist faculty with acquiring research career development awards and large-scale research grants (continual)</td>
</tr>
<tr>
<td></td>
<td>• Provide short boluses of time for completion of a scholarly activity such as initiating a pilot project, writing a small grant proposal, developing an article (2000–2007)</td>
</tr>
<tr>
<td>Leadership</td>
<td></td>
</tr>
<tr>
<td>Highly regarded scholar, research-oriented</td>
<td>• Select first research director, a PhD researcher with expertise in research productivity, faculty development (1996)</td>
</tr>
<tr>
<td></td>
<td>• Transition leadership to accomplished MD/MS researcher with sustained federal funding in a department priority area (2007)</td>
</tr>
<tr>
<td>Keeper of the vision, group advocate, fundraiser</td>
<td>• Affirm research mission and goals at faculty meetings</td>
</tr>
<tr>
<td></td>
<td>• Publicize research accolades to external stakeholders</td>
</tr>
<tr>
<td></td>
<td>• Acquire funds for fellowship, research infrastructure</td>
</tr>
<tr>
<td>Assertive-participative leadership style</td>
<td>• Engage faculty in research program governance via faculty meetings, retreats, advisory council of senior researchers</td>
</tr>
<tr>
<td></td>
<td>• Conduct meetings of technical support team to collaboratively solve problems, define and review productivity goals</td>
</tr>
<tr>
<td>Champion of institutional characteristics</td>
<td>• Allocate in-kind funds to support research program faculty and staff, fellowship program, faculty scholars program, travel to scientific meetings, other initiatives outlined above</td>
</tr>
</tbody>
</table>

be measured by the achievements of the investigators they supported. In turn, the faculty understood that by investing in these resources, our department head signaled a firm commitment to the research mission—an attitude not widely espoused before these initiatives began.

**Foster individual characteristics and increase protected time for research**

We launched several efforts to strengthen our faculty's research abilities and increase their research time. We implemented a department-funded faculty scholars program in which physician faculty members completed a two- to three-year program with 50% protected time for training, pilot research, results dissemination, and proposal writing. Selection was competitive, requiring a formal application with an individualized career development plan that included regular mentoring meetings, clear milestones, and a time line. Scholars were encouraged to acquire a research degree. They were also expected to submit a grant proposal to an external funding agency (e.g., an NIH K-award to continue their mentored research training, or an NIH R-award to support their own research). Scholars received work space outside of clinic, priority access to the technical support team, and paid travel to national scientific meetings.

Second, we identified faculty members whose past research accomplishments and clear passion for a research career made them viable candidates for career development awards from external funders. These investigators received substantial mentoring from the research program's council of senior advisors during their proposals' development. They also benefited from the technical staff’s assistance with literature searches, study design, analysis of preliminary data, and proposal review/editing.

Last, we directed resources toward early- to midcareer faculty members who already had sufficient research training, a credible track record of publications, and modest external funding (e.g., from the state health department, small foundation grants), but had not yet achieved sustainable funding and national recognition in a focused research area. Although well prepared for research careers, nearly all of these investigators had significant clinical responsibilities. To support more time for research and spur their progress toward research-intensive careers, the research program initiated mock peer reviews of their first R01 proposals to federal agencies (NIH, Centers for Disease Control), helped identify collaborators, and provided...
substantial experimental design and writing support.

Broker opportunities to change appointment type

Formal expectations for advancement in an appointment type can influence a faculty member’s distribution of time and productivity across professional activities. In 1997, 78% of the DFMCH faculty were in nontenure, professional staff appointments with no expectations to engage in research. In the first five years of our research program, the department head and research director facilitated the movement of several research-driven faculty members into the tenure track, providing them with an “up-or-out” motivation to succeed. The retirement of some tenured faculty members, coupled with the dean’s approval of three new tenure-track positions, made these changes financially feasible. Of note, the retiring members were not a “research loss” for the department, as all had long since disengaged from substantial involvement in research.

Beginning in 2001, the department head also encouraged the transfer of existing faculty members (those with academic professional staff appointments), and the appointment of subsequent new clinician hires, into the medical school’s new clinical scholar track. This track is not in the tenure stream, and reappointments occur annually. Importantly, clinical scholars are reviewed against criteria that include not only educational and clinical excellence but also productive engagement in research and scholarship—though at a more modest level than expected for tenure-track faculty. Moreover, these criteria explicitly value the development, peer review, and dissemination of new educational products, clinical aids, or technology, as well as participation in quality improvement projects. Because the clinical scholar track has no explicit time line for promotion, faculty members with heavy clinical and teaching demands have ample time to meet the promotion criteria. Together, these features helped shift the research culture of our department. As more faculty members entered the clinical scholar track, a greater proportion were expected to engage in research according to the standards of their new appointment, while being incentivized for research achievements by the formal reward of promotion in rank.

Implement formal mentoring

To ensure that all of our developing researchers had guidance from experienced senior faculty, we matched each investigator with a mentor. It was important to develop a formal mentoring program with departmental oversight, because the geographic dispersion and low overall research capacity of the department were not conducive to spontaneous, informal mentoring. The research director and council of senior advisors facilitated mentor-mentee matching through their established collegial networks, which were useful for identifying qualified mentors outside of the department or medical school, as was often needed.

Identify clear, coordinating goals

Highly research-productive departments not only place a high priority on research in general but also refine this emphasis into specific goals to coordinate research and identify areas of investment. To define research priority areas for the DFMCH, our council of senior advisors and other senior faculty members systematically examined the following: active research programs in the department, areas in need of research in family medicine, the research priorities of our medical school and AHC, and areas with high potential for attracting federal funding. The profile that emerged included five focus areas: geriatrics, preventive medicine (especially in cancer, cardiovascular disease, and HIV/AIDS), sexual health, women’s health, and health services research.

We clustered our research-engaged faculty members into priority teams within these areas. This strategy was intended to prompt new collaborations and informal mentoring, strategically distribute technical resources, and promote a positive group climate. Each team was coordinated by a senior DFMCH researcher (0.05 FTE, funded by HRSA) and charged with initiating activities to increase its members’ productivity (e.g., works-in-progress seminars, practice sessions for presentations, new collaborative projects). We allocated HRSA funds to engage a national consultant in each research area. Consultants offered distance mentoring and visited the department at least once per year to give presentations in the topic area, meet with the faculty, and advise the department head and research director.

Offer meaningful rewards

Research achievements were recognized in our new faculty merit system, initiated in 1998. This systematic, peer-reviewed approach allowed faculty members to accurately document time and accomplishments in different professional roles, including research. Merit pay increases, travel funds, and other recognition were linked to ratings generated by this approach. Research was also rewarded through public recognition of new articles and grant awards at faculty meetings, congratulatory e-mails from the department head, and a display of recent publications in the main administrative office suite.

Foster a research culture

All the activities described above helped cultivate a culture of research. We also held quarterly research meetings to bring together our geographically dispersed investigators. This meeting provided a venue for interacting across the research priority team structure and reporting to a larger audience on research results and methods. Also, our writer/editor facilitated a series of writing workshops to establish confraternity among faculty members engaged in scholarly writing projects.

Provide strong leadership

Effective leadership is one of the most essential characteristics of research-productive organizations and was critical during our initial stages of growth. Our department head from 1997 to 2001 had previously served as the vice provost of the AHC. In this role, he helped redefine the mission of our larger institution; thus, he understood the urgency to strengthen the DFMCH’s research orientation. He created the research program and initiated a formal internal search for its first director to ensure that the selected leader would be a highly regarded scholar.

The chosen candidate (C.I.B.) was a tenured professor and internationally recognized expert in evaluation, family medicine education, research productivity, and faculty development. Her research track record, combined
with an in-depth understanding of the department’s educational and clinical missions, positioned her to be an effective leader during a time of significant culture change. Moreover, she modeled an assertive-participative leadership style in which faculty actively engaged in research program governance through faculty meetings, retreats, and the council of senior advisors. Similarly, research program staff met regularly with program leaders to collaboratively solve problems, define and review productivity goals, and adjust their service models.

Consistently since 1997, the department head allocated in-kind funds—an average of $344,000 per year through 2007—to support our research enterprise (e.g., partial salary support for research program leaders and staff, full cost of the faculty scholars program, computers and software for research, administrative needs of the mentoring program, space renovations to house new faculty scholars and staff). To reinforce the value of research more broadly, the head provided a subset of less-research-intensive faculty members with small amounts of protected time (e.g., 10% for one or two years) to engage in activities such as taking a course on research, working as a coinvestigator with a senior researcher to design/conduct a study, or designing/publishing a curricular or clinical innovation.

Both the department head and research director engaged in the essential leadership roles of “keeper of the vision,” “group advocate,” and “fundraiser.” They routinely affirmed the department’s research mission and goals at department meetings, disseminated reports of our research accomplishments, and acquired federal HRSA grants to support our infrastructure and activities. The department head ensured that our successful growth in research was visible to influential leaders within the medical school and AHC. This prompted both affirmation and financial support from the Dean’s Office for a portion of the research director’s salary and new tenure lines.

Research Productivity Outcomes
Data collection
To assess the impact of our initiatives, we collected data on a variety of outcomes over the first decade of implementation. Research program staff acquired data under the oversight of the research director and associate director. We reported outcomes annually to internal stakeholders and in regular grant progress reports to HRSA.

We queried the University of Minnesota Reports system to obtain faculty numbers and rank; the type and number of grant proposals submitted by, and awarded to, our faculty; and total sponsored projects expenditures per year. We used the NIH’s Web-based reports to acquire annual award amounts and rankings. To quantify published peer-reviewed articles per year, we reviewed the faculty’s CVs and searched online databases. We counted publications with multiple DFMCH faculty authors only once. We calculated research FTE from faculty members’ self-reported percentages of time spent on research, as recorded in required documents for our merit review system.

Research funding and dissemination activities
The DFMCH’s investments in multiple research-facilitating programs and practices appear to have been successful by several measures. Total sponsored project expenditures rose from $1.46 million in 1997 to $3.80 million in 2007, with a high of $5.34 million in 2006 (Figure 2). For this 10-year period, the average annual growth in sponsored project expenditures was 15.8%. Growth was slower in the first four years, which we attribute to our faculty’s engaging largely in research training and smaller-scale, start-up research. The number of funded proposals quadrupled from 5 in 1997 to 22 in 2007. We also experienced welcome gains in the proportion of grants acquired from federal agencies and private foundations (Figure 3). Our department’s proposal success rate, defined as the ratio of funded grants to submitted proposals, is available for 2000 through 2007 (Table 2). For these eight years, our annual success rate for all proposal types averaged 51.4% (range 42.5%–64.7%).

Our annual NIH funding rose substantially during the 10-year reporting period (Figure 2), which is reflected in our national ranking on this measure. Throughout the 1990s, our department’s NIH ranking hovered in the midteens. We reached a rank of 6 in 2002 and, from 2003 through 2007, maintained a top 5 ranking. Although NIH funding is just one part of our research portfolio, these high-profile gains were a source of pride for the entire department, offering motivation to continue growing our research enterprise.

Contributions to the knowledge base through peer-reviewed publications also increased (Table 2), lagging behind grant funding. We saw the largest gains in the last 3 years of our 10-year reporting period (37 articles in 1997; 50, 58, and 53 articles in 2005, 2006, and 2007,
respectively). The timing of these gains was likely influenced by the completion of grant-supported projects and an overall shift toward a culture that highly valued scholarship. Faculty members commonly included students, residents, and fellows as coauthors. This practice was more common when a faculty member’s research was externally funded.

Research capacity and training outcomes

We experienced the research growth described above without actively recruiting tenured or tenure-track investigators. Although our faculty size increased from 1997 to 2007 (Table 2), most were hired as academic professional staff or clinical scholars for predominantly educational and clinical roles. This suggests that our “grow-your-own” approach to increasing the department’s research capacity—an approach heavily focused on research training, mentoring, and technical support—was a significant driver of the observed productivity gains. We observed modest increases in the proportion of research-trained faculty and total research FTE across 10 years (Table 2). Data from our merit review system indicate that the increased research time is largely attributed to acquisition of external funding by existing faculty members, allowing them to reduce their clinical load and devote more time to research.

Our targeted research training efforts helped successfully launch and/or solidify the careers of multiple investigators. Our internally funded faculty scholars program supported three faculty members. One scholar left the department, but the remaining two developed sustainable research programs (supported by the NIH and other funders). From 1998 to 2001, four DFMCH faculty members successfully competed for Advanced Research Training Grants from the American Academy of Family Physicians (AAFP). We were the only institution to have an AAFP scholar every year of the program’s existence. Another faculty

![Figure 3](image-url)

Figure 3  Percentage of the total number of grants awarded per academic year, by funding source, to the Department of Family Medicine and Community Health (Twin Cities campus), University of Minnesota, 1998-2007. Data were acquired from the Proposal and Awards Report, generated by the University of Minnesota Reports system. HRSA indicates Health Resources and Services Administration.

<table>
<thead>
<tr>
<th>Program characteristic</th>
<th>Baseline year 1997</th>
<th>Capacity-building period, two-year means</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2006–2007</td>
<td></td>
</tr>
<tr>
<td>Grant proposals submitted*</td>
<td>Not known</td>
<td>40</td>
</tr>
<tr>
<td>Grant proposals funded, no. (%)</td>
<td>7</td>
<td>18 (46)</td>
</tr>
<tr>
<td>Peer-reviewed articles†</td>
<td>37</td>
<td>32</td>
</tr>
<tr>
<td>Total full-time faculty</td>
<td>68</td>
<td>71</td>
</tr>
<tr>
<td>Tenured/tenure track, no. (%)</td>
<td>15</td>
<td>16 (21)</td>
</tr>
<tr>
<td>Clinical scholar, no. (%)</td>
<td>NA</td>
<td>5 (7)</td>
</tr>
<tr>
<td>Academic/professional, no. (%)</td>
<td>55</td>
<td>47 (66)</td>
</tr>
<tr>
<td>Total faculty research FTE</td>
<td>6.6</td>
<td>6.9</td>
</tr>
<tr>
<td>% Faculty with research training‡</td>
<td>35%</td>
<td>39%</td>
</tr>
<tr>
<td>Tenured/tenure track</td>
<td>60%</td>
<td>67%</td>
</tr>
<tr>
<td>Clinical scholar</td>
<td>NA</td>
<td>40%</td>
</tr>
<tr>
<td>Academic/professional</td>
<td>28%</td>
<td>29%</td>
</tr>
</tbody>
</table>

*From 1997 to 1999, submitted proposals were not tracked by the University of Minnesota Reports system.
†Publications with multiple faculty authors were counted once.
‡Faculty member has a research degree (master’s or PhD).
member received a Robert Wood Johnson
Generalist Physician Scholar award,
whereas four others acquired first-time
NIH R01 awards or federal “R01-
equivalent” awards from the Centers for
Disease Control or National Institute of
Justice. All used their protected time and
resources to develop focused research
agendas and have been promoted in
their track.

Although the DFMCH did not
proactively recruit research-intensive
faculty members, we benefited in later
years (2004 and 2006) from the hiring
of two midcareer researchers, both of
whom were attracted to our department’s
supportive research environment.
Without the preceding mission and
culture changes, these subsequent
research-oriented hires were unlikely
to have been deemed a good fit for our
department.

Research priority areas
Our attempt to build research cores in
specific priority areas was moderately
successful. Our research efforts in HIV
prevention and sexual health flourished,
and in 2007, we established the nation’s
first Endowed Chair in Sexual Health
at our Program in Human Sexuality.
These research areas were strengthened
by an existing cohort of faculty who
already possessed the many individual
characteristics that predict research
productivity; by strong leadership
that encouraged collaboration (e.g.,
coauthorship, coinvestigator status
on grant proposals); and by these
investigators’ commitment to pursue
research in well-funded areas.

In our women’s health and preventive
care areas, investigators were individually
very successful, but their interests were
too diverse to find common ground for
new collaborative projects. Instead, their
collaborations emanated from a matrix
of university and national colleagues,
oftentimes outside of family medicine.
Two other areas—health services and
geriiatrics—rapidly declined in scope
when the university’s seniors’ clinic
closed, prompting the departure of four
strong investigators for positions at other
universities. This outcome illustrates
the influence of the institutional
environment on research productivity
and the need for retention efforts and
other means of supporting productive
investigators.

Strong, sustained research emphasis
Our most important, overarching
mission is that the research emphasis
of the DFMCH has taken firm root and
substantially matured. Within three years,
the research program was fully woven
into the department’s fabric and remains
vibrant today. Scholarship is now a matter
of citizenship and celebration among
all faculty members, regardless of track.
Department leaders have continually
affirmed the research mission, even in
a difficult economy (which typically
demands increased clinical time) and
with the transition to a new department
head in 2002.

Outcomes Update
Since 2007—the end of our first decade
of proactive research growth—the
DFMCH has maintained its research
productivity gains. From 2008 through
2011, our faculty submitted a total of
56 research proposals; 34 (64%) were
funded. This portfolio includes a healthy
mix of funding sources, approximately
46% of which were federal. The
department ranked either 2 or 3 in
NIH funding among family medicine
departments from 2008 through 2010.
Our ranking dropped to 8 in 2011,
but our total NIH dollars awarded still
summed to over $2.2 million, a level
we have maintained or exceeded each
year since 2004. The department’s
peer-reviewed publication count has
also been stable, averaging 54 per year
in 2011 and 2012. (These data are
conservative, estimated from reports
of new publications in departmental
newsletters). Through a combination
of our faculty’s maturing research agendas
and recent new hires, we developed a
critical mass of researchers in two new
areas—obesity prevention/treatment
and health disparities. The burgeoning
number of clinical scholars has also
prompted growth in other research
foci, such as medical education, sports
medicine, and community-engaged
research.

Perspectives on Our Success
Bowman et al29 aptly noted that
“increasing … research productivity is
an institutional challenge that requires
multiple complex actions over a sustained
period of time.” Such was our experience.
Our initiatives and investments were in
place several years before we observed
notable changes in classic markers of
research productivity, such as external
funding and publication count.
Accordingly, DFMCH leadership has
had to continually attend to the research
enterprise to yield the desired benefits.

Although the outcomes we observed
were in the desired direction of greater
research productivity and capacity,
variables other than the described
department-level efforts could have
influenced these outcomes, either
positively or negatively. For example, we
cannot discount the drive of individual
faculty members to advance their own
research careers, even without the many
supportive features the department
put into place. Moreover, given the
complexity of our approach to advancing
our research mission, it is impossible
to definitively identify the influence of
any one strategy. Instead, we conclude
by offering our informed perspective on
what we deem to be three of the most
important contributors to our research
growth: effective leadership, systemic
culture change, and strategic adaptation
of approaches. In our discussion of
these factors, we acknowledge some
extradepartmental factors likely to have
supported our success.

Leadership
When the goal is research growth,
we agree with others30,36,38,39 who
give substantial credit to consistent,
supportive leadership. A past department
head had the vision to create the research
program and its associated activities
as a catalyst for change. The current
department head (2002–present), an
accomplished scholar committed to the
research mission, has continued these
efforts. At the start of our endeavor, the
DFMCH had an overwhelming need
for research faculty development and
mentoring; we benefited enormously
from having that expertise in our first
research director. On her transition
to an assistant dean position, research
program leadership passed to one of our
most successful primary care physician
researchers, who has since facilitated
welcome growth in practice- and
community-based research.

Culture
The importance of a shared research
culture cannot be overestimated.21,39,55 We
observed the DFMCH’s culture transform
dramatically during a 10-year period. The starting point was an environment in which research was in the background, an activity pursued by a select few while the majority of faculty focused exclusively on education and clinical service. By 2007, the faculty had evolved to better appreciate the importance of producing new knowledge through research, with members encouraged to engage in research and scholarship at a level suitable for their track and professional goals. Numerous culture-sustaining activities continue today. The most notable is a monthly research faculty meeting, which features a presentation of research results by a DFMCH investigator, updates on institutional research policies and resources, and public celebration of new grant awards and publications. These meetings also offer the faculty a critical opportunity for networking and informal mentoring.

Extraregional factors also contributed to our success in developing a more research-intensive culture. Just as our fledgling research program was taking root, our medical school articulated a strategic goal to improve its NIH standing, and our AHC increased its investments in clinical research (with oversight by a new Office of Clinical Research, now the Clinical and Translational Sciences Institute). Moreover, the university articulated a goal of being among the top three public research institutions in the nation. These local cultural drivers, coupled with a national focus on the clinical research enterprise, enabled us to successfully build on our initial momentum. In a less supportive environment, we might have found ourselves moving away from the more costly direction of investing in research.

Responsive adaptation of strategies
Perhaps most important, our approach to facilitating research productivity was not static. We adapted in response to contextual changes such as the availability of financial support, impact of our initial strategies, and gradual maturation of our research enterprise. One of our most substantial (and practical) adaptations was our approach to providing technical resources. As Title VII primary care funding declined at the national level, our ability to fund our centralized support team was strained. Fortunately, external funding for individual research projects increased, allowing investigators to support more of their own research expenses, including personnel. As our grant activity increased, so did the need for more personnel to support pre- and postaward financial and administrative functions. In a sense, our department’s “start-up period” gradually shifted toward a more traditional way of supporting research.

We also changed our approach to brokering research training opportunities. Within four years, we had successfully engaged all interested DFMCH faculty members in the faculty scholars program or assisted them with acquiring external research career development grants. Thus, in 2001 we acquired a HRSA Faculty Development Grant to establish our own three-year clinical research fellowship for family medicine physicians. Current faculty could enter the program, but we also recruited nationally in hopes of training new investigators whom we might retain as faculty. Through 2008 we graduated six fellows, retaining one as a clinical scholar in women’s health. Unfortunately, the threat of more severe reductions in Title VII funding discouraged the renewal of our fellowship—a reality experienced in other primary care settings. Beginning in 2005, however, the university acquired NIH funding for two new institutional research training programs: a Roadmap K12 (to fund trainees in multidisciplinary clinical research) and a BIRCWH K12 (Building Interdisciplinary Research Careers in Women’s Health). Because of our earlier efforts, we were well positioned to recommend promising candidates for these competitive programs. By leveraging extensive front-end support from the research program—to assist with establishing interdisciplinary mentoring teams, framing research questions and hypotheses, constructing training plans, and refining the written application—two of our most promising junior faculty members were selected as K12 scholars.

Conclusion
During a decade of strategic investments and evolving strategies, the DFMCH at the University of Minnesota (Twin Cities campus) realized laudable and sustained gains in its collective research productivity and emphasis. Our approach included multiple strategies aimed at the individual, institutional, and leadership characteristics of highly research-productive organizations. Overarching drivers of success were effective leadership, systemic culture change, and the self-awareness to adapt to changes in the local, institutional, and national research environment. These features enabled us to successfully transition from needing a faculty-development-supported model of research growth to having a critical mass of faculty-led research teams, each with increasing success in attracting external funding and engaging the next generation of primary care trainees in research.

Acknowledgments: The authors thank Dr. Macaran A. Baird, department head and professor of family medicine and community health, and Dr. Mark Yeazel, associate professor of family medicine and community health, for their helpful feedback during the development of this manuscript; and the many other faculty who have contributed to the advancement of the Department of Family Medicine and Community Health research mission as leaders, mentors, advisors, learners, and investigators.

Funding/Support: The initiatives described in this article were supported in part by grants from the Health Resources and Services Administration (Academic Administrative Units in Primary Care, D54HP00002 and D12HP00002; Clinical Researcher Development, D55HP05168 and D14HP00103) and by funding from the Department of Family Medicine and Community Health and Medical School Dean’s Office at the University of Minnesota.

Other disclosures: None.

Ethical approval: Not applicable.

Previous presentations: Portions of this manuscript were presented at the Joint Statistical Meeting, Denver, Colorado, August 2008 (oral presentation by B.A.C.) and at the Annual Conference of the American Medical Writers Association, Pittsburgh, Pennsylvania, September 2005 (poster presentation by A.M.W.).

References


132–137.

2006;85:560–567.


2005;77:368–376.


2003;78:34–60.


2008;83:1002–1003.