An innovative strategy for reinvigorating clinical research and training

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Over the past two decades, it has become apparent that diminishing numbers of young American medical graduates engage in clinical research activities. Many publications have analyzed the causes for and addressed the means by which this trend can be reversed. The National Institutes of Health have put into place several mechanisms to encourage young physicians to become physician-scientists. However, virtually no attention has been given to older physicians who might be so inclined. In this paper we suggest two innovative means by which to enable senior faculty to retrain and actively engage in fruitful clinical research and mentoring of medical students and young physicians. In addition, we suggest a more modest option by which senior faculty may obtain career stimulus when department and/or institutional resources are extremely limited.

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Introduction

Recent dialogue has highlighted the debate surrounding the decline in numbers of young physicians choosing to embark on a career in medical research.[1-6] There can be very little doubt about the fact that a decline in number has occurred; the data indicate both a relative and absolute drop in number of physician-scientists over 15 years between 1983-1997.[7] The situation has been met with a great deal of productive activity by the National Institute of Health, as attested to by the creation of K23, K24 and K30 grants directed at encouraging patient-oriented research.[3] A very significant factor in the decline, however, is the degree of debt incurred by students following a traditional pathway to the M.D. degree, since unlike the M.D.-Ph.D. track, the former is not heavily subsidized by the Federal or state governments. This debt is compounded by the financial sacrifice implicit in the decision to become an academician where patient-oriented research is most likely to be performed.[1] The debate, centered upon the young medical school graduate, whose average debt at graduation in 2001 was more than US$99 000,[1] (CNY 742 500 Chinese yuans; at 1 USD = 7.5 CNY) has neglected the older academic physician population. The productivity of this group has been severely constrained by the changes in financial structure of academic medicine. It is this segment of academic physicians upon which we wish to focus in this commentary.

Background

A noteworthy result of the halcyon days of NIH-sponsored training grants is the many physicians whose subspecialty careers were nurtured in the 1970s who are now senior faculty members, equipped to engage in superb and insightful clinical research. However, systemic changes in health care reimbursement and medical education,[8-10] in combination with the explosive growth of the basic sciences, have constrained academic physicians in their traditional research practices. These trends have also made it increasingly difficult for many research-trained and experienced physicians to maintain the necessary expertise for attaining funding in areas of bench-top investigation. These faculty members, therefore, are increasingly forced to engage in clinical practice for economic reasons while the "inborn talents to learn and practice their art" in research developed earlier in their careers remain idle and become eroded with time.

As the need for academic institutions to make efficient use of available resources becomes increasingly apparent,[8,10,11] the visibility of this group of faculty

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increases. Unfortunately, in today's "industrialized" medical environment, this visibility is not always to their advantage, for they are senior and therefore usually at the higher end of the pay scale. They are also frequently subspecialty eligible or boarded and may have been away from general medical practice for many years. Thus, unless they are trained in a relatively lucrative area, such as Cardiology, they cannot earn substantial portions of their salaries through clinical income. The consequence of this has been to render these highly-trained, highly-competent people less able to contribute than they could and should be to what is somewhat inaccurately termed "The Academic Mission" of their respective institutions. Such a waste of individual and social investment makes a compelling case for change. The real question is how best to utilize the expertise in making changes? Our contention is that it is this pool of individuals which represents both the raw material and the instrument for the necessary changes.

Roads to a solution

We believe that the remedy for this situation is readily at hand and requires only the mustering and refocusing of the research expertise and training of these talented and committed individuals, bringing it to bear on patient-based research questions. Of course, this will necessitate a commitment of time and resources by the parent institution and academic department. Yet, given the proper mix of encouragement and support the result in many cases is likely to yield dividends whose value is far beyond that of the investment. To accomplish this may require as little as a brief tutorial association with an active clinical investigator or as much as completion of an in-house fellowship in a new subspecialty. These alternatives are discussed below.

Tutorials in clinical investigation

There are many differences between basic and clinical research, not only with respect to techniques, but in the challenges as well. As an obvious example, the basic scientist is able to rigidly control many of the experimental variables in the design of a scientific approach to a question. By contrast, the clinical scientist must contend with variables which not only remain beyond control, but may even be unintentionally misrepresented by some of the subjects in a study. These could include family history, dietary intake, etc; faulty information could be a pivotal factor in misinterpretation of the study's outcome. At the same time, such factors represent a major challenge in study design not faced by the basic scientist. Although the technique of a double-blind study can be constructively used in animal studies, it is not commonly utilized because of the ability to rigidly control environmental factors. However, application of a double-blind technique is basic to clinical research, in order to demonstrate differences among the study population exclusively due (as closely as possible) to the controlled variable under investigation. One aspect, key to the success of making a career change from basic to clinical research, will be a complete understanding of the new challenges and a renewed sense of the excitement which attends on meeting and overcoming them, as in all research endeavors.

To make a successful and smooth transition from basic to clinical research, it may be advisable for a faculty member to gain experience in study design during a short association with a colleague who is actively engaged in such research. It has been said that "one technique equals a thousand papers"; while this may be an exaggeration, a valid answer to a research question still requires good study design, which must be learned. The novice clinical investigator must also learn the bureaucratic aspects of clinical research, including informed consent issues and legal responsibilities to study subjects. Such issues and procedures, although relatively easy to master in the abstract, must be constructively applied in study design; this can be expeditiously learned through practical experience.

As facility is gained in general study design, clinically-related research questions in the individual's area of expertise and original research training may be expected to emerge. Given the practical constraints on research into basic mechanisms, addressed above, there is still potential for collaboration with colleagues in the basic medical science departments. We have previously discussed the fruitful marriage of clinical and basic science research in solving problems which might otherwise have remained unanswered to this day.[6] Collaboration between clinical and basic scientists is critical to the best sort of biomedical research and is an important first step toward "integrative scholarship" advocated by several authors.[12,13] It is worthy of note that such collaboration can also form the nidus for successful clinical research into questions generated from the basic research itself, in a bidirectional fashion.

In summary, then, this avenue for retraining of a senior faculty member provides an opportunity for the individual, previously engaged in laboratory research efforts to become involved in clinical care of patients who fall into his/her area of expertise. In addition, selected members of this physician's patient population can become subjects of a clinical research endeavor culminating in grant support and a renewed and vigorous career.

Retraining through internal sabbatical

As outlined above, changes in reimbursement formulas have made it necessary for clinicians to see more patients in a given amount of time merely to maintain a constant income. This necessarily renders those academicians highly vulnerable who depend upon referrals for their patient base, since most such physicians have few options for expanding the size of this base. In addition, some subspecialty fields do not include remunerative diagnostic or interventional techniques, such as biopsies or catheterizations. Thus, non-funded senior clinicians in laboratory-based subspecialty fields like infectious disease, genetics or endocrinology may earn clinical income which increasingly lags behind that of their colleagues in more clinically-directed specialty areas. Administrative and scholarly activities may enable these faculty members to remain professionally involved and occupied, but these categories of involvement are not income-generating and leave these physicians financially vulnerable.

All physicians will recognize the following principles: 1) the human organism functions in a highly orchestrated, cooperative manner in health; 2) disease causes disruptions in this arrangement, leading to cellular and physiological adaptations. As a consequence of these underlying principles it is apparent that the divisions among subspecialties are artificial in relation to the impact of disease on the human body. As an example, the fact that renal proximal tubular and small intestinal epithelial cells share common genetic features[14] makes common ground between genetics, nephrology and gastroenterology. The endocrine-exocrine properties of the pancreas and intestine are shared areas between gastroenterology and endocrinology, and constitute another example where common ground can be found. While fellowship training in one of these areas may not render an individual prepared to care for patients in another, the general groundwork necessary for a rapid learning curve in a new subspecialty area already exists for the experienced, senior faculty member. Moreover, the clinical skills common to all well-trained physicians are immediately at hand, so that the chief requirement to gain expertise in a new discipline is the clinical contact and experience. This can be easily gained within one's own institution by association with colleagues in the subspecialty area of interest during an internal sabbatical.

An example of a unique and more modest way to develop faculty skills is a program developed at the University of Nebraska Medical Center in 2000. This program is known as the mini-sabbatical and the program provides up to US$5000 (37 500 Chinese yuans, at 1 USD = 7.5 CNY) to enable a faculty member to spend up to three months training in a specific area of interest. Two examples include one faculty member who worked closely with individuals at another university who were developing web-based learning. The faculty member spent the entire three months learning the skills and developing his own website for online teaching of neurological diseases. This website uses visual demonstrations of different forms of neurological symptoms and has CME and student testing potential. Since the site's inception, it has received many plaudits and has gained the faculty member a national reputation in the area of web-based learning. This specific faculty member has gone on and published several articles regarding how to develop a learning site and has been invited to two major international meetings as a keynote speaker. Another faculty member chose to spend time at a distant university working closely with a pediatric neurologist. The faculty member, whose skills were in the area of genetic diagnosis, developed an expertise in interpreting MRIs for specific syndromes. This has lead to nine publications, as well as the initiation of a textbook on specific MRI findings in certain genetic syndromes. Both faculty members felt the sabbatical was an outstanding experience and led them to increase their academic productivity. In order for each of these faculty members to spend three months off clinical service, they worked closely with their section and the Chairman to make sure their colleagues had sufficient coverage during their absence. In the future, it is intended other members of the section will be able to free their time for a mini-sabbatical, due to the efforts of these two faculty members. Five thousand US dollars is a modest investment in a faculty career and, yet, it was more than sufficient for both faculty members to accomplish their goals. It is important that these goals be well stated for their three months and that they be approved by a committee on research and faculty development as a worthwhile endeavor. It is the intent of the department to continue this program and even encouraging some faculty to take the standard six month to one year sabbatical, although most faculty feel that is far too much time for them to invest and to leave their colleagues with a significant clinical load.

Senior faculty who follow this pathway will be newly-equipped for collaborative clinical research in patient-based subspecialties, while able to enhance their clinical income and financial contributions to the institution. Their career interests will become rekindled and a new sense of purpose and heightened morale will emerge as they bring to bear their newly-acquired expertise on patients and clinical research. Increasingly constrained financial resources for recruitment can be utilized to attract young faculty to develop areas

of future need, instead of "plugging holes" by adding to existing staff. Hence, by making the investment in the development of selected members of their senior faculty, Chairs can once more begin to make rational plans for the future needs of their departments.

Fringe benefits

Changes in the view of medical educators toward the importance of professional behavior of medical students and residents[15-18] enhance the potential role of senior faculty. The moral commitment of a clinical researcher to the well-being of his/her subjects is in perfect harmony with the profession-wide clamor for the teaching of such a commitment. The compelling desire to improve the quality and longevity of human beings through patient-based research, coupled with the experience and knowledge necessary to attempt such improvements is a potent mix by which to communicate humanistic ideals. Teaching by example has been the foundation of medical education since Hippocrates. If it were an ineffective means it would long since have been consigned to the scrap heap of medical history. Cultivation of an institution's senior faculty in clinical research endeavors provides a ready solution to the dilemma of how to teach professional values in a medical school curriculum. In this regard, medical educators must lend their support to this effort to efficiently and effectively improve methods (some of which have been questioned) of achieving their own goals. Russell has eloquently argued that the "White Coat Ceremony", conceived to symbolically convey a "connectedness" with the principles of the Hippocratic Oath, creates instead a sense of entitlement and false authority.[19] To effectively counter this, physicians must resume responsibility for curriculum planning and execution, as well as to provide effective role models.

The effect of a senior faculty member's presence as a trainee can have an enormous positive impact on both residents and students, as an object lesson in life-long learning. The association of senior faculty with the resident staff in such a new venue can lead to constructive changes in the relationship of house staff to faculty. The resident's perception of a professor in a learning mode is likely to lead to less reluctance to ask questions, to create a more level playing field in personal interactions and encourage more effective and less formal mentoring.

Conclusions

We believe that there is a compelling need within academia for an innovative approach to the financial problems with which it is currently presented. Little can be done by an institution to alter the patient-care reimbursement scheme in order to increase revenues. Similarly, little can be done to change the research funding priorities of the National Institutes of Health. However, we submit that much can be accomplished intramurally to better utilize precious faculty time and expertise and, in the bargain, conserve and possibly enhance financial resources.

We advocate an atmosphere of increased flexibility in academic institutions for senior faculty who request internal sabbatical time in order to gain board-eligibility in a different subspecialty area from that in which they have been trained. Looked upon as a pure financial investment, it is self-evident that the time spent in direct patient care by a well-trained clinician increases efficiency. Moreover, in those areas of the faculty where vacancies exist, the slots can be filled by internally-trained board-eligible faculty members without the expense of recruitment and additional salary and benefit outlays. With respect to enhanced collegiality, department morale and faculty retention, such a modus operandi could be counted upon to achieve all three.

Beyond this, by permitting and aiding faculty in retraining, the parent academic institutions accrue the following: 1) enhanced potential for research funding; 2) improved morale and faculty retention; 3) increased freedom for Chairs to make long-term recruitment plans for their departments; and 4) creation of an ideal model for students and residents[20,21] of humanitarians and life-long learners, motivated physician-scientists and more accessible mentors. In short, it can be said that "the thing speaks for itself" as a proposal which brings positive benefits for everyone.

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