Academic Medicine – Experiences from Finland and Suggestions for the Future

Vedran Stefanović

Department of Obstetrics and Gynecology and Institute of Clinical Medicine, Helsinki University Central Hospital, Helsinki, Finland

This article presents the basic facts about education, health care system, and academic medicine in Finland. The issue of the academic medicine in the world is discussed and Finnish models compared with those of the rest of the world. Possible solutions for the recovery of academic medicine, education, and research are proposed.

Key words: clinical medicine; education, medical; Finland

The mission of the physician is to safeguard the health of people, and his or her knowledge and conscience should be dedicated to the fulfillment of this mission. We, physicians, do research involving human subjects to improve diagnostic, therapeutic, and prophylactic procedures and the understanding of the etiology and pathogenesis of diseases. We see illness and suffering not merely as molecular derangements to be repaired, but as an integral part of our being, which can provide us with an appreciation of what it means to be human. But what does it mean to be an academic physician?

One of the joys of academic medicine is in unleashing dormant human capabilities in our colleagues, residents, and students. Anyone can make a truth claim, but not everyone can provide all relevant arguments and data to corroborate it. Those who can advance their ideas into tangible results have had to overcome various obstacles including problems in scientific communication, appropriate financial support, and problems in finding the way to evade or adjust to sometimes bizarre but well-known hierarchy in their scientific surrounding.

Some believe that academic medicine is in crisis (1-3). We are suffocating under the thousands of pages about academic medicine, which contain more phraseology than proposals for the improvement. But let us consider some practical aspects of academic clinical medicine (in the aspect of real life) and give proposals for the evaluation and revitalization of the academic medicine. Let us see where the academic medicine “comes from” and focus on the academic medicine in Finland and discuss some global aspects of the world’s medicine from the Finnish national, economic, and historical viewpoint.

Nomen Est Omen

Words academy and medicine in Latin are both of feminine gender. Poetically speaking, they evoke the beauty of Aphrodite, the strength of Diana, and wisdom of Athena. Academia was a place where Plato had an open school for demos inclined to attend his instructions (4). Some sources say that the Academy was originally a public garden or grove in the suburbs of Athens, named after Academus or Hecademus who left it to the citizens for gymnastics. The word was also frequently used in philosophical writings from ancient Rome, indicating the academe, the patricial, and the noble, or a place where plebs were not allowed. The WordNet Dictionary (5) defines the adjective academic as “hypothetical or theoretical and not expected to produce an immediate or practical result” and as “marked by a narrow focus on or display of learning especially its trivial aspects”. Of course, the original meaning of the academic differs from that it has today. The same applies to the adjective clinical (a word of Greek origin, κλινή – bed), which is defined by the same source as “scientifically detached; unemotional” (6).

Finland – Background

Finland is the fifth largest country in Europe, with a population of 5.2 million. It is one of the wealthiest countries in the world, with highly educated people and the highest technology in the world (Table 1). Still in 2002, Finland was declared the world’s most wired country with more mobile telephones and more Internet connections per head than any other (7). This is mostly because Finland, like other Scandinavian countries, combines affluence with a small population and tradition of advanced telecommunications. According to the latest corruption perception index
and obesity remain common in Finland. Smoking and excessive consumption of alcohol, and accidents. Cardiovascular mortality has declined in response to effective health and nutritional education in recent decades, but excessive blood cholesterol concentration and obesity remain common in Finland. Smoking and drug abuse are significantly less frequent in Finland than in Europe on average.

Science and research play an important role in Finnish society. According to the Finnish Science Barometer 2001 (11), Finns trust scientific institutions more than the legal system or the church. A large majority of Finns (80%) think that the science and research in the country are excellent and 70% think that cases of misappropriation of research funds are exceptional and should not brand the entire scientific community. The ethical acceptability of scientific research and the credibility of research findings entail that research is conducted in accordance with good scientific practice. The use of animals and genetically modified organisms is regulated by law.

**Woman in Finnish Society and Medicine**

Finland has been called the paradise of equality. In 1906, Finnish women were the first in Europe to receive the right to vote and the first in the world to obtain the right to become electoral candidates. About one-third of the Finnish Parliament members are women. The gender distribution at the top of the political hierarchy changed during the presidential election in 2000, when Finland elected a woman president for the first time. In contrast to other countries in European Union, long-term unemployment is not primarily a problem of young people and women. By international comparison, relatively little part-time work is done in Finland.

Along with Sweden and Denmark, Finland has the largest proportion of women among academics. In 2000, women in Finland received 45% of a total of 1,156 doctoral degrees, and more than half of PhD degrees in social welfare and health care studies. The proportion of female professors in Finnish universities is the highest in European Union, about 20%, and in 2000, women occupied over one-third of all Academy research posts (12). While the number of doctors has more than doubled over the past three years, the number of women with PhD has even tripled from 1991. Especially in the medical, health care, and social sciences, Finnish women study for doctorate more often than their counterparts in other countries (13). Almost half of all physicians in Finland are women (Table 2).

There is a feminization of medical practice in Finland. For example, at the Department of Obstetrics and Gynecology in the Helsinki Central University

| Table 2. Age and sex distribution of Finnish physicians, January 1, 2004* |
|--------------------------|--------------------------|--------------------------|
| Age group (years)        | No. of physicians (%)    |
|                         | all                      | female                  |
| <30                     | 1,132 (6)                | 759 (67)                |
| 30-34                   | 2,217 (11)               | 1,395 (63)              |
| 35-39                   | 2,547 (13)               | 1,629 (64)              |
| 40-44                   | 2,886 (14)               | 1,689 (59)              |
| 45-49                   | 3,138 (16)               | 1,611 (51)              |
| 50-54                   | 2,673 (13)               | 1,116 (42)              |
| 55-59                   | 2,030 (10)               | 700 (34)                |
| 60-62                   | 1,018 (5)                | 339 (33)                |
| >62                     | 2,478 (12)               | 717 (29)                |
| Total                   | 20,119 (100)             | 9,955 (49)              |

*Source: Finnish Medical Association.
Hospital, there is only one male trainee at the moment. The same decreasing trend in recruitment of male trainees is felt in other specialties as well. The Academy of Finland has made a plan to better promote gender equality of the Finnish science community. It contains 36 proposals for further actions, including that the minority gender shall have at least 40% representation in research posts and that the Academy will investigate as to how to nominate more women than previously to Academy professorships in the natural sciences and engineering (12).

Medical Education

Basic medical education in Finland can be obtained at five universities. The number of applicants to medical schools is five times higher than the number admitted, about 600 in the whole country annually. Studies have traditionally involved initial two years of preclinical and four years of clinical practice. Today, students have a contact with patients from the very beginning of their studies and a problem-based learning method has been introduced and widely accepted. All medical schools have research programs for students, the so-called research track. Great importance is given to the problem-based learning and, due to the high technological development of the country, all modern ways of obtaining relevant medical and other information are available virtually to everybody. The University of Helsinki is the only university in Finland that belongs to the League of European Research Universities, founded in 2002. The 12 universities in the League were chosen on the basis of an impartial evaluation; Helsinki University ranked the fifth (14).

In 1998, all clinical departments at University of Helsinki were merged into a single large unit, the Institute of Clinical Medicine. The Helsinki Curriculum, introduced in 2000, integrates specialty-based teaching into organ-system or clinical symptom-based teaching (15). Vertical integration does not always work, mainly because of the lack of time. The majority of teachers passed a six-weeks course in university pedagogy organized by the Development and Research Unit of the Faculty and one-week course for mentors in evidence-based medicine organized by the medical teachers themselves. The problem-based curriculum with increased small-group teaching has resulted in increased workload for teachers, whereas the budget cuts have resulted in a reduced number of teaching jobs. Clinical medical teachers also work as clinicians, which usually results in work overload without equivalent financial compensation.

The new law on specialist training became effective in January 1999. All previous subspecialties were discontinued and the total number of specialties was reduced from 92 to 49. Specialist training is carried out at the Helsinki University Central Hospital and 40 other teaching hospitals all over the country. The Medical Faculty has appointed a professor responsible for each of the 49 specialties, who meet the residents in their specialty once a year, make proposals for the selection of new residents, and follow up the evaluation of the individual residents throughout intern-based monitoring and registration system. The university specialist degree includes 6-month training in the primary health care and 4.5-5.5 years of specialist training depending on specialty, 80-220 hours of theoretical courses (including 20 hours of administrative courses), and the national specialist exam (a 6-hour written exam with 6-20 questions). For a subspecialist degree, further 2 years of training and national exam are needed (10). Traditionally, hospital residents are encouraged and expected to undertake research towards the end of their specialist training. A PhD degree is in most cases a senior physician requirement.

During undergraduate medical education, students have to take part in practical training in a local hospital. The University covers travel and meal expenses, whereas the host hospital provides lodging in a hospital dormitory. During specialist training, every trainee at the Department of Obstetrics and Gynecology in Helsinki University Hospital is granted €1,000 for educational purposes, whereas each senior physician is granted €1,500.

Discussion and Proposals for Improvement

How to Create More Money for Education and Research?

As Charles Dickens said, a good Samaritan is a bad economist. In Finland, education has traditionally been free of charge, ie, financed through the tax system (15). Students can get a loan with a possibility to deduct approximately 30% from their final tax. Expenses up to a certain amount spent in educational purposes (registration fees, transportation, and hotel expenses) are also tax deductible if one has not received a refund from other sources. The same applies for books, computers, and all other material bought for the educational and research needs.

Let us consider some possible obstacles in the scientific development and co-operation in the European Union (EU) after May 1, 2004. The European Science Foundation (ESF) has 27 years of experience in multinational co-operation at the European level that involves 70 member organizations from 27 countries and individual institutions and research councils from not EU member states. With the expansion of EU, the idea and need to establish the EU-based European Research Council (ERC) emerged. Thus, the European Research Council Expert Group (ERCEG) was established in December 2002, during the Danish EU presidency in order to create a possible ERC.

The most important issue in the process of the ERC foundation is, of course, money. One model would be to use money from Brussels. Another extreme is not to involve EU at all, but to build on national research councils. But to fund a reasonably healthy, or even wealthy, council, a lot of money would be needed from member states. With 10 new countries knocking at the door of the EU, it would not be an easy task. New members joining EU on May 1, 2004 are coping with serious economical problems and it will take quite a long time to realize the importance of the investments in science and technology as the only way of national prosperity.
In 2000, Finland spent 3.5% of its gross domestic product (GDP) on research and development (16), which is the highest in the EU (average 1.99%). On the other hand, Lithuania spent only 0.44% of its GDP for research and development. There is already a growing resistance of the wealthiest EU countries toward the expenses required for the EU organization, especially after the accession of 10 new counties, which are far away from the European economic average. How the funds would be divided and which "key system" and quotas would be employed is still very uncertain. Nobody knows if solidarity would win. One possibility is that every country should keep the diversity of funding, with minor influence of giant bureaucracy and with increased flexibility. The scientific funds should be owned by the scientists and the scientific community, not the administration. In Finland, we made the decision 20 years ago and, despite crises and changes in the system, were able to keep the support of science and technology at a very high level. The influence of medical professionals in the Finnish Parliament is not negligible.

The two actions of the Finnish Academy are directly linked to finances: one is the paragraph according to which researchers in researcher training or working abroad may be granted 20% increase in their grants if they have underage dependants. Another is a so-called incentive money received over 2-6 months, intended particularly for young researchers and women researchers. This money can also be granted to researchers returning to work after paternal leave (12).

In a large part of Western world, especially in the USA, profit is the primary performance indicator. Sometimes we approach patients as if they were airline passengers, selectively seeking out business-class types who pay well and avoiding those in the super-saver category because the profit is not as high. Clinicians begin to equate financial rewards with service. Fortunately, health insurance system in Finland gives physicians the opportunity and freedom to choose the best available medicament, diagnostic, or surgical procedure for the patient irrespective of the costs. However, hospital budgets are tight and due to budget cuts, the operating costs of Finnish hospital have been reduced by 15% over the past few years. All three social missions of the Academic medical centers – patient care, teaching, and research – could be in jeopardy.

Constructive suggestions to solve this problem:
- Academic clinicians should be present in governmental organizations; thereby the academic clinical medicine could achieve louder resonance. Skilful physicians with good organizational skills should be voted for to help them enter different political forums, or even Parliament!
- Physicians should attend administrative courses to learn more about financial management.
- Chief physicians, heads of departments, should think about rationalization in their hospital/department, removing overlapping systems/procedures that waste money, and avoiding buying expensive instruments that are not really needed.

Public Relation
All sections of society must be involved in making decisions about the directions and applications of scientific research to reduce current public distrust and fear of science and technology and to direct scientific and technological advances in a better way towards improving the quality of life and health people throughout the world. Openness is an essential feature of science. The detailed basis of any scientific claim must be open to scrutiny, criticism, repetition, and refute. As academic physicians, we must be willing to share our fundamental values about medicine with public. Machines are not magical. The solution to every problem need not involve a computer. The cloning of Dolly the sheep came as a big surprise to the public, which had no idea that cloning of animals was possible. The subsequent cloning of other animals, and the suggested development of "designer babies" by cloning humans, has created major ethical and moral issues for the public. The issues of science can not be separated from issues of culture and society and each new scientific discovery is resulting in an increase in public worry about science.

Constructive suggestions to solve this problem:
- Physicians should emphasize in public the importance of education and research in every appropriate situation, because most educational systems depend on public sources.
- Physicians should do honestly explain to the laypeople the significance of scientific achievements, using the appropriate language.

Presenting Results for Evaluation
The pressure to publish research papers in journals with high impact factor is getting stronger as universities increasingly rate achievements of academic physicians according to their publications. Grant providers, funding institutions, governmental bodies, and evaluation committees for academic posts do the same. At this stage, more than 50% of articles have no citation at all, and 15% of the articles account for 50% of the journal citations (17). Thus, the journal’s impact factor tells us little about the citing rate of individual articles. Peer review is another important element in the overall critical assessment of new scientific knowledge. Referees are almost always anonymous, and their reports are seen only by a few insider authors, editors, and adjudicators. Most scientists are keenly aware of the merits of peer-review. They are, however, blind to fact that, when there is a conflict between the interests of peer group and that of the public, discreet review by peers alone produces conclusions biased in favor of the peer group. For this reason, peer review should be broadened and opened up, nevertheless respecting the strict scientific criteria of review. There is an increasing awareness of the problem of “information” overload. Excessive information impedes its assimilation and therefore does little to improve knowledge and understanding.

Constructive suggestions to solve this problem:
• Achievements of young investigators should not be evaluated only by the number of articles in journals with high impact factor.
• Reviewers should not give in to any pressures from outside; they should be objective and keep neutral. One should take their time for reviewing; otherwise they should just leave it to somebody else.
• “Clinicians” should be encouraged to become “academic clinicians”!

Introducing Young Physicians into the World of Academic Clinical Medicine

One of the most joyful aspects of scientific work is teaching and sharing the knowledge. Studies into effects of stress, isolation, and bullying at work usually did not include academic medical setting. Only recently an internet-based survey has been performed to assess the overall level of satisfaction among 259 British doctors undertaking research (18). A significant association was found between not recommending the post to a colleague and having difficulties in arranging funding. Significant correlation was also found between dissatisfaction with the post and lack of help, support, and advice from supervisors and colleagues, with workplace bullying, and with an inadequate clinical commitment. The dissatisfaction was associated with wanting to change supervisors and a threat to professional status.

Medical literature is massively expanding, and scientific publishing is dramatically changing primarily due to electronic media. However, electronic publishing carries the risk of poorer quality control, publication of not-reviewed articles, and abuse of “copy and paste”. The transmission of the knowledge from one person to another has passed several milestones: from acquisition of language to the acquisition of a written language and then through the Gutenberg’s invention of the printing press to the creation of the Web. Patients are often overwhelmed by information they receive in doctor’s offices and much of the information is lost. Web education should not replace the traditional physician-patient and teacher-student interactions, but complement them.

Majority of physicians in training who enter a career in clinical research never even apply for an independent research grant, maybe because they are discouraged by daunting issues in clinical research career. Kotchen et al (19) examined the role of the peer review process at the National Institutes of Health (NIH) as a barrier to clinical investigation. The authors cite the oft-repeated concern among clinical investigators that the NIH peer review process discriminates against clinical research.

Constructive suggestions to solve this problem:
• Many students publish with their supervisors and sometimes questions arise about the order of the authors. To avoid such problems, the authorship should be discussed and agreed upon early in the candidature.
• Supervisors should remember that students sometimes experience personal difficulties. Therefore, the supervisor-student relationship should be kept open enough so that a student can share their problems and seek advice without feeling that their personal or professional life is threatened by that in any way.
• Academic teachers and supervisors should receive pedagogic education. Teaching skill can be learned.
• Clinical research should be stimulated!

Academic Medicine, Quo Vadis?
The roles of academic medicine should be the following: a) rational application of scientific achievements into clinical practice; b) offering the highest level of education, research, and improvement of health on a global level; c) fighting for the global health despite all political and economical barriers; d) educational and ethical guard of medical researches; and e) stimulation of a scientific way of thinking in medicine.

Academic medicine should be:

- Accessible to everybody
- Constructive
- Able to incorporate dynamic changes of the society – demography, business, and even politics
- Democratic in organizational sense
- Equal-opportunity giving
- Measurable (in terms of results and achievements)
- Inclined to new influences and International
- Competitive (in a non-profitable way)

- Modern
- Educative
- Delightful
- Intolerable to any kind of racism and bias regarding political, religious, and sexual orientation
- Capable of bringing science closer to the public
- Incorruptible
- Nobility-free
- Effective to provide practical results

Arts and Medicine

As a form of human self-expression and creative work, art constitutes a social and economic resource and a cultural basic right. Scientific research and development, as well as art, generate globalization. However, science is deeply rooted in culture. It is not possible fully to understand science without understanding the history, sociology, psychology, and language of people who produced it. Consequently, scientific activity helps to maintain and strengthen individual cultural identity and, through scientific achievements, spreads different cultures efficiently and quickly.

Academic physicians are like artists. They may not receive public acclaim of and financial satisfaction in their work, as Monet did not receive any for his “Sunrise”, a painting not especially interesting for the public or the critics at the time, but priceless today. Or they may feel as Vincent van Gogh, giving in to their own creative demons and dedicating themselves
to their profession because there is no other option for them.

Conclusions

Academic medicine could be renamed into academic clinical medicine, because even preclinical research ultimately serves to the object of our interest – the patient. Radical changes are not necessary, but improvement in all sectors might be. Hospital (especially university hospitals) should remain the principal places of education and research, but the connection between them and remote medical units should be much closer. Methods of training should be improved and modernized following technical development. Pedagogic education of clinical teachers should be stimulated and the responsibility of the academic clinical medicine should be recognized on the national levels worldwide. Job satisfaction of those working in academic clinical medicine should be improved by making it economically attractive career option – the era of Charles Dickens is over, life is expensive! Everyone should screen the situation on her/his own territory and improve the situation according to the available resources and personal skills. Finally, I do not think that sunset in academic medicine is approaching. Even if it is, we await the New Sunrise!

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Correspondence to:
Vedran Stefanovic
Department of Obstetrics and Gynecology
Helsinki Central University Hospital
Haartmaninkatu 2
00290 Helsinki, Finland
Vedran.Stefanovic@hus.fi