The policy context

Vietnam is undergoing a fundamental change in the way that medical education is financed. Until quite recently, a comprehensive government subsidy system paid for all medical education including tuition costs, student fees, food and living accommodation. In return, graduating students were committed to working for the government health service. However, since the beginning of the 1990s, as the country has adopted a more market-oriented economic system, the following questions have arisen:

• As students begin to pay some of the costs of medical education, how do tuition charges to students relate to actual costs of education?
• Foreign students are accepted for training in MOH medical schools. What should they be charged for tuition?
• In some settings the school belongs to the Ministry of Education (MOE) and the teaching hospital to the Ministry of Health (MOH). What are the costs of clinical teaching that could result in a transfer payment from the MOE to the MOH?

The last two questions are particularly important as under-investment in the education of other members of the health services can have serious consequences for the quality and sustainability of health care. The first two questions, if answered in a reasonable way, will facilitate resource management and help to set tuition charges at a school and adjust budget allocations between medical schools, teaching hospitals, and health centres. When linked to quality indicators, trends within and useful comparisons between schools are possible. Cost comparisons between different types of providers can assist policy-makers in judging the appropriateness of expenditures per graduate for nursing and allied health education versus physician education. If privatization of medical education is considered, cost analysis allows policy-makers to know the full costs of educating physicians including the subsidies required in clinical settings.

Our approach is intuitively simple and provides useful, understandable new information to managers and policy-makers. The full cost per medical graduate in 1997 was 111 462 989 Vietnamese Dong (US$9527). The relative expenditure per Vietnamese physician educated was 2.8 times the expenditure in the United States when adjusted for GNP per capita. Preliminary findings suggest that, within Vietnam, the cost to educate a physician is 14 times the cost of educating a nurse.

Given the direct costs of physician education, the lifetime earnings of physicians and the costs that physicians generate for the use of health services and supplies, it is remarkable that so little attention is paid to the costs of educating physicians. Studies of this type can provide the quantitative basis for vital human resource and health services policy considerations.
team, particularly nurses, decreases the efficiency and effectiveness of physicians and the overall health care delivery system. In turn, higher nurse-to-physician ratios may substitute for many physician functions at a lower educational and lifetime support cost. A additionally, if one accepts the notion of physician-induced demand (Jaeger and Jagers 2000), and that physicians may be able to induce greater demand for services than other health workers, substituting nurses and other auxiliaries for physicians may generate lower treatment costs.

A narrowing of any of these questions requires cost analysis. There is, however, the concern that the focus on cost analysis may appear too high. Governments are likely to seek ways to reduce their costs and generate revenue directly from students and enterprises run by medical schools. Thus, it is important to identify the full costs of medical education. The government needed to know this was at the heart of the study.

In the United States, whenever there has been a shift in the mode of financing medical education, there has been a renewed interest in determining the costs of medical education (Jones and Korn 1997). The same holds true in Vietnam. In other countries, as overall financial demands on the government increase, the cost of medical education may appear too high. Governments are likely to seek ways to reduce their costs and generate revenue directly from students and enterprises run by medical schools. Thus, it is likely that medical schools in other developing and transitional economies will face similar questions. The policy-oriented, cost analysis method we describe provides a basis for setting tuition charges, determining the extent, if any, of government subsidies and provides good answers to the cost component of the nine questions above.

Literature review

The costing methodology literature relevant to medical education is very limited and is almost entirely from the developed world (Smith et al. 1994; Franzini et al. 1997; Jones and Korn 1997; Rein et al. 1997). A review of the methods of medical education should appear in the early 1970s. Three closely related reports from Australia (A ndrew 1976; A ndrew and N ehrmann 1977) and the United States (M ulhausen et al. 1989) consider the cost impact of medical student teaching on the overall costs of teaching hospitals. The overarching feature of these methodologies was an emphasis on determining, through analysis of the curriculum, the proportion of faculty hours dedicated to teaching medical students. One study expressly stated, 'all data were based on faculty contact hours (FCHs), the primary driver of cost' (Rein et al. 1997). Indeed, our study also considers faculty and staff contact hours as the primary cost driver at Thai-Binh Medical School. In spite of the substantial costs associated with the education of physicians in developing countries, our search found only one summary of education, among costs reported – from Chile (Pizzi and Riesco 1979) – and a non-quantitative theoretical study from Bulgaria (Pencheva 1980).

A common theme in the literature is the difficulty in determining how much of the work in the clinical facility can reasonably be ascribed to the medical education function (G oodwin et al. 1997; Rein et al. 1997). The problem is not just that the teaching hospital is a separate institution, with separate overhead structures and staffing patterns, but also that much of the clinical work that is performed at a teaching hospital serves both a patient care function and an educational function. Rein et al. express it eloquently: A though it is, indeed, a wonderful aspect of medical education that both can be accomplished at the same time, for purposes of accounting it is necessary to try to assign the fraction of the time attributable to each endeavor separately (1997, p. 221). Clearly, the most reasonable way to make this type of determination is to engage the teaching staff in a conversation about their work. They are the best judges of what work they perform on a day-to-day basis. Also, if the staff are involved in developing the assumptions underlying a cost study, they will be much more likely to accept the results.

Methodology overview and results

Our costing model is a type of full-cost analysis. It can be used to analyze costs within a school, analyze cost variation between different years of medical education, compare costs between schools, and, when combined with results from a sample of schools, to provide a sound basis for estimating overall national investment in physician education. The methodology was developed at the Thai Binh Medical School, one of the four regional medical schools run by the Ministry of Health (MOH) (Goodwin et al. 1997). It was subsequently refined and expanded based on further testing at Thai Binh and two other MOH medical schools (Bach-Thai and Hai-Phong). These three schools educate over 30% of Vietnamese physicians. The model identifies the full cost of medical education per graduate incurred over a period of 6 years; the actual cost for each of the 6 years, which varies widely; the average cost per year; and the cost by major curriculum component. The model was created in spreadsheet form using Excel software. The model’s logic is summarized below. Our analysis is confined to the costs of medical education incurred at teaching sites and excludes housing, subsistence and the out-of-pocket expenses for books and supplies that may be incurred by students in addition to tuition. In addition to being the first full-cost analysis of medical education in Vietnam, this is the first reported full-cost analysis of medical education in a low-income developing country in over 20 years and the only reported cost analysis that explains the method, provides details and, on request, the full model.

Our approach is generalizable. After the development and testing of the model at one school (Thai-Binh), it was successfully tested again at Thai Binh and at two other similar schools (the abovementioned Bach-Thai and Hai-Phong) without expatriate technical assistance.
The structure of medical education

As our methodology follows the structure of Vietnamese medical education, we summarize its structure here. Vietnamese students enter medical school directly from secondary school and study for 6 years. Within the 6-year curriculum there are four components:

- Preparatory work
- Medical science
- Clinical theory (classroom-based)
- Clinical practice (in hospitals, clinics and health centres)

The first three components take place largely or exclusively on the medical school campus and have identifiable costs in the medical school budget. The last component, where students gain their first experience with hands-on patient care, takes place in clinical sites and the expenses of teaching are part of the budget of the specific hospital, clinic or health centre.

Methodology in brief

Curriculum analysis

By analyzing the curriculum we determined the allocation of teaching hours, shown as a percentage, to each component within each academic year, as shown in Table 1. An alternative way of showing similar information is shown in Table 2: the percentage of each curriculum component completed in each academic year.

Thus, although Year 1 is devoted exclusively to preparatory work, preparatory work is not completed until Year 2. Similarly clinical theory and clinical practice are spread over the last 3 years of medical school. These percentages and the hours behind them are used to allocate costs.

Determining costs

This was done in several steps:

1. We determined where the medical school staff (faculty and non-faculty) spent their time by analyzing current staffing tables and determining actual assignments by discussions with managers. These findings were later used to allocate costs by curriculum component.
2. Although the medical school’s primary task is teaching medical students over a period of 6 years, the school also is responsible for upgrading assistant doctors, the academic component of the first post-graduate medical degree and short continuing education courses. We determined that these activities consumed 36% of the school’s resources. Sixty-four percent of total costs were attributable to the education of medical students.
3. By analyzing the actual expenditures by budget category from the school’s financial records, we determined the actual annual expenditures of the school. These figures needed to be adjusted to include costs external to or not included in the school’s financial records. Some were readily identified such as courses and training for faculty paid for by the central M.O.H. Others, such as pension payments, costs of debt service from national and multinational sources, and the costs of supervision from the central ministries, are extremely difficult to identify and we were not able to quantify these costs. However, their absence should be noted, particularly if comparisons are to be made with the private sector. Capital costs were first estimated at 10% of recurrent costs. This figure was later validated when a 5-year analysis of capital costs was completed. Our final estimate of annual operating costs of the medical school attributable to the education of medical students was US$653,397, as shown in Table 3.
4. Expenditures for medical student training in clinical sites were determined by budget analysis of clinical sites, an estimate by the Director of Thai-Binh hospital, and a
workshop of key personnel from medical schools. The annual clinical site costs attributable to medical students were US$259,919 as shown in Table 3.

(5) Next we integrated the results from the steps above, allowing us to derive the inclusive annual recurrent expenditures attributable to each of the four curriculum components. We used number of personnel as the basis of allocation of both personnel and non-personnel costs. For example, if 25% of personnel were attributed to a particular component we assumed that non-personnel expenses would follow similarly and allocated 25% of the schools recurrent expenditure to that component.9 We allocated various administrative or overhead costs in like manner. This allowed us to identify the total cost of educating all medical students at Thai-Binh by curriculum components as shown in Table 3.

(6) By combining the curriculum analysis with cost data we were able to determine actual annual expenditures by curriculum component and academic year, as shown in Figures 1 and 2.

Table 3. Total cost of educating medical students at Thai-Binh

<table>
<thead>
<tr>
<th></th>
<th>Preparatory work</th>
<th>Medical sciences</th>
<th>Clinical theory</th>
<th>Sub-total medical school</th>
<th>Clinical practice sites</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Donga</td>
<td>1,172,195</td>
<td>2,522,767</td>
<td>3,949,787</td>
<td>7,644,749</td>
<td>3,041,048</td>
<td>10,685,797</td>
</tr>
<tr>
<td>U$5</td>
<td>100,188</td>
<td>215,621</td>
<td>337,589</td>
<td>653,397</td>
<td>259,919</td>
<td>913,316</td>
</tr>
</tbody>
</table>

* In thousands.

Figure 1. Expenditure by curriculum component

Figure 2. Expenditure by year for the education of a medical student. Total educational cost per student = U$9,527
Revenue

The vast majority of revenue came from the MOH budget. Revenue was determined by analysis of accounting records and interviews with accounting and managerial personnel. The cost of generating additional non-MOH revenue was determined. However, the actual non-MOH revenue generated could not be precisely determined as there was concern that quantification could result in a decrease in the MOH budget allocation. At the time of the study, we believe the non-government revenue was very small and did not make a significant difference in resources. However, as schools are being encouraged to generate non-governmental revenue and there is pressure on the government budget, revenue from non-government sources can be expected to increase in the future.

Discussion and policy implications

Caveats

A physician is not a standard item with an agreed upon universal definition. The education of a physician in terms of preparation before medical school and length of time in medical school varies from country to country. The relative proportions of clinical and non-clinical teaching also vary between and within countries. There is no international measure that defines the competencies or performance level of a standard physician. These factors alone make cross-national qualitative comparisons very difficult.

Cost comparisons between different countries are no easier, as accounting standards typically vary from country to country and within countries between the public and private sectors. Further, despite efforts to standardize national accounts (Berman 1997), this is still a hope, not a reality.

Finally, from our review of the literature it is clear that there are no more than a handful of medical education cost analyses reported from outside the United States and none are recent (Andrew 1976; Andrew and Nehrmann 1977; Pizzi and Riesco 1979; Pencheva 1980). US estimates are not numerous and are summarized by Jones and Korn (1997). Twenty-six were done before 1975 and none in the 1980s. For those done in the 1990s, Jones and Korn report that four of six estimates adjusted to 1996 US dollars are in the $72 000–93 000 range per student per year or a cost per graduate range of $288 000–372 000 for 4 years of medical school after college. This compares to our finding at Thai-Binh of a total 6 year educational cost per student of $9527, approximately a 35-fold (34.6) difference between the United States and Vietnam.

While keeping the foregoing caveats in mind, comparing the ratio of medical education expenses to per capita GNP between different countries allows the relative magnitude of investments to be compared. Table 4 shows cost per graduate and GNP/capita for the United States and Vietnam, and the ratio of cost per graduate to GNP/capita for each country. In proportion to its economy, Vietnam appears to be making a per student investment that is approximately three times the US investment (32.9/11.8 = 2.8).

Table 4. Vietnam and United States medical expenses and Gross National Product* (in US dollars)

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country</td>
<td>GNP/Cap</td>
<td>Cost/Grad</td>
<td>GNP/Cap</td>
<td>B/A</td>
</tr>
<tr>
<td>Vietnam</td>
<td>290</td>
<td>9 527</td>
<td>11.8</td>
<td>32.9</td>
</tr>
<tr>
<td>United States</td>
<td>28 020</td>
<td>330 000</td>
<td>11.8</td>
<td>32.9</td>
</tr>
</tbody>
</table>

* All GNP data are for 1996 from World Development Indicators 1998 on CD-ROM. Data Development Group, The World Bank.

In brief, in either economy, it is a very expensive proposition to educate a physician and, in relative terms, much more so in Vietnam than in the United States. Such an expensive and heavily subsidized investment merits the attention of policymakers, particularly when resources are severely constrained. We found it remarkable that the costs of medical education, and their implications, have had so little attention in the developing world.

Although there are real difficulties in making valid and useful cross-national comparisons, this in no way vitiates the generalizability of the method, nor its usefulness as a tool for management at the level of a particular medical school and policy analysis at the national level, whether in Vietnam or elsewhere. The primary policy and management value of this tool is within a particular country.

Cost, adequacy of funding and outside employment

It is important to remember that cost does not necessarily equate with adequate funding. For example, cost reflects the current funding of a library and this may not be sufficient to allow for buying subscriptions to key journals or acquiring new texts. The same holds true for laboratories, maintenance and any other element of the medical school where there may be inadequate funding. When considering personnel this problem becomes very acute.

In Vietnam, as the country moves from a centrally planned economy with low salaries and no private practice to a more open economic model, physicians see their living costs escalating without commensurate change in their salaries. Therefore they take on private practice. This has the effect of decreasing the teaching commitment of physicians on the faculty: they spend less time teaching and more time in private practice. Exactly the same forces affect non-physicians and, rather than private practice, they supplement their incomes by taking extra jobs. In effect, if government wants to maintain a full-time or near full-time staff, they must pay a living wage and an amount that is comparable to what faculty and staff are earning or can earn from all sources. Only then can a medical school realistically require personnel to work a full day and have little or no outside income. For this reason, in an earlier iteration of our cost analysis, we displayed the full cost of educating a medical student at Thai-Binh, with a 130% increase in personnel expenses. We costed at this figure to show policymakers that if they wish the medical
The costs of medical education in Vietnam

Quality and cost

It can be argued that, within a given country, a minimum quality standard applicable to all graduates is a socially responsible objective. However, this is by no means universal practice. Particularly in resource constrained environments, such as Vietnam, where there are national and regional schools with sponsorship by the Ministry of Health, Ministry of Education and the Military, there is the potential and, arguably, the need to determine the relationship between cost of production and quality of output in different settings. Cost analysis of the type we describe is a necessary step to allow such comparison to take place. However, cost in isolation is difficult to interpret and the drive for lower cost can be destructive if there are no measures of quality to assess the impact of changes in investment on the graduate. Thus, it is a very positive sign that the Ministry is developing a national examination for medical graduates. When such an exam is in place, it should be able to provide a very useful measure for assessing individual graduates and the overall performance of individual medical schools. When cost data are linked to quality data, decision-makers will be in a far better position to assess the need for additional investment, to determine where investment may be in excess, and to identify factors which affect cost and quality both favourably and unfavourably.

Some simple potential indicators suggest the power of considering cost and quality data together. A school with a consistently high efficiency score (the pass rate of a school on the national exam when implemented) allows a corrected cost per graduate to be calculated. The corrected cost adds the cost of failed production to the cost of successful production. Thus, a school that had a 50% pass rate, all other things being equal, would have twice the corrected cost of a school with a 100% pass rate. With national exam results, schools could be compared by the mean score for all graduates and corrected cost per graduate. Perhaps higher costs would be associated with better exam results and perhaps not.

A better way to compare the costs of medical education is to use the corrected cost to compare schools in different settings. To the extent public hospitals are used to train medical students, the private to public subsidy costs can be illuminated by a comparison with public sector tuition fees. If privatization of medical education is considered (and the authors are not suggesting this is desirable), private tuition fees can be illuminated by a comparison with public sector costs. To the extent public hospitals are used to train medical students from private schools, the public to private subsidy can be estimated. Cost and quality comparisons between public and private are also possible, particularly if private schools are organized on a for-profit basis, comparisons become more difficult. It may be very difficult to distinguish between reasonable profit and excess profit taken by the owners at the expense of educational quality.

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Quality data, decision-makers will be in a far better position to assess the need for additional investment, to determine where investment may be in excess, and to identify factors which affect cost and quality both favourably and unfavourably.
nursing education (Bicknell and Tham 1998). Comparing the production costs of different types of health manpower, particularly if linked to quality, costs of services produced and lifetime costs of supporting different categories of workers, can be a step in rationalizing the mix of human resources devoted to health care in a country.

Conclusion

This is the first time in Vietnam that a full-cost analysis of medical education has been done. More broadly, an extensive literature search suggests this is the only full-cost analysis of medical education to be reported from a developing country in at least the last 20 years. The method uses readily available existing data and is relatively easy to apply. The model has already been adapted to two similar schools in Vietnam and its simplicity makes it adaptable to similar schools elsewhere in Vietnam and in other countries.

A cost analysis of this type is useful at the level of a medical school for purposes of assessing resources applied within the curriculum. It is useful at the national level, particularly when linked to quality data, to assist in making judgments about the appropriateness of physician production costs in different settings. When cost sharing with students is being increased and tuition subsidies from government reduced, this method provides data for setting tuition fees. It also allows governments to determine what to charge a student should they wish to buy out of a national service obligation, or what to charge a foreign student. Both are situations where full costs are required to be recovered. When considered with production cost data for allied health professionals, this type of data can illuminate policy choices that speak to the mix and costs of production costs of different types of health manpower, particularly if linked to quality, content of services produced and lifetime costs of supporting different categories of workers, can be a step in rationalizing the mix of human resources devoted to health care in a country.

Given the significance of medical education in terms of direct costs of production, the lifetime earnings of physicians and the costs that physicians generate for the use of health services and supplies, it is remarkable that so little attention is paid to either the cost of producing physicians or the implications of those costs in terms of lifetime costs and benefits to society. This methodology, particularly when linked to data that describe the quality of graduates, provides a powerful tool for human resources policy analysis in the health professions.

Endnotes

1 See findings on costs of nursing education later in this paper.
2 The Ministry of Health recently performed a survey to determine the typical student's living expenses. The study indicated that a student's food, housing, transport and books cost approximately US$500 per year.
3 A nine-day interview in a detailed description of the model and a working copy of it should contact either Dr Bicknell or Mr Beggs at wbicknel@bu.edu or beggs@bu.edu, by fax at +1 617-638-4444, by telephone at +1 617-638-5234 or by mail at the Department of International Health, Boston University School of Public Health, 715 Abbott Street, T469, Boston, MA 02118–2526, USA.
4 Dr William Bicknell and Mr Phi Van Tham carried out fieldwork at the request of the Department of Science and Technology of the Ministry of Health and with the support of the Swedish International Development Agency (SIDA) through INDedevelop, an Upsala-based consulting group. Dr Bicknell's research with Mr T Tham took place between April 20 to May 4, 1997 and February 22 to March 14, 1998. Further work was carried out by Mr T Tham in Vietnam and by all authors in Boston as part of Mr T Tham's MPH studies in 1998.
5 The Ministry of Health operates four medical schools that educate 70% of physicians in Vietnam. A third school, a teaching hospital with its own faculty, is in the final stages of establishment. To satisfy the Ministry's goals, there is considerable variation between countries in their approach to establishing medical education. To what extent, if any, an exchange rate different than the one used here should be considered has yet to be determined. This is very unrealistic. In one venue (Lesotho), one of us (WB with R Puglisi, unpublished data) compared the square footage and personnel methods for determining PPP is unlikely to be entirely relevant to medical education. To what extent, if any, an exchange rate different than the prevailing rate should be used we leave up to the reader. We feel that using an exchange rate based on PPP would introduce a non-quantifiable distortion that would cloud interpretations and tend to obscure the value of the method. It is also worth emphasizing that this analysis was done for policy-makers in Vietnam and the relevant currency is Vietnamese Dong not US dollars or any other hard currency.
6 An acute general teaching hospital, mental and tuberculosis hospitals, district hospitals and commune health centres. Medical students spent most of their clinical time at the teaching hospital, which had the highest recurrent budget of any clinical site.
7 Some cost analyses use square feet or square metres to allocate non-personnel expenses. We have found that, although more common in the United States, space allocations are rarely known in most developing countries. However, personnel allocations even if not known can be rapidly and accurately determined. The measurement of space is very time consuming and, to be useful longitudinally, would have to be regularly updated. This is very unrealistic. In one venue (Lesotho), one of us (WB with R Puglisi, unpublished data) compared the square footage and personnel methods and found the final cost results to be very similar, with no evidence that one method was superior to the other. We have assumed that costs follow people and allocated all costs (both overhead and direct) in terms of staffing patterns and curriculum hours. A Thal-Thi Binh, the difference between faculty and non-faculty salaries was not significant. As personnel costs are often a very large percentage of total costs, if there were large pay differentials between faculty and staff and the proportion...
of faculty to staff differed significantly between programme areas, then we would have to consider a correction for this difference. Sources of revenue will likely include student fees including some portion of tuition, fees from entrepreneurial activities such as profits from operating a pharmacy from parking fees. A forward-looking school anticipating the growth of private practice should also consider instituting a practice plan that shares private practice revenue between the physician and the school, as discussed later in the text.

12 Personal observations of Dr Bicknell from the observation of medical education in Canada, Egypt, Nigeria, Holland, India, Indonesia, Jamaica, Nepal, Pakistan, the Philippines, South Africa, Tunisia, the United States and Zambia.

13 Personal experiences of Dr Bicknell in numerous African, Asian and Caribbean countries.

14 Surprisingly, we have not found any cost analyses from Western Europe.

15 The variation in definition of costs and great variability in how revenues and expenditures are classified and recorded is another significant contributor to the difficulty of cost comparison between countries.

16 We use the midpoint of the $288 000–372 000 range in Table 4.

17 The 2.8 figure does not change if the Vietnamese figures are expressed in terms of Purchasing Power Parity (PPP) as the actual medical education expenditure and the per capita GNP would both be multiplied by the same constant. Because of our concerns with the relevance of PPP (see endnote 7), we did not use PPP here.

18 In a personal communication from Dr William J Bicknell, the National Statistics Bureau is reported to have found that only one-third of the personal income of government workers comes from their salaries and the balance from other sources.

19 This 130% on top of existing salaries may well have been conservative. We used this estimate before learning of the study by the National Statistics Bureau mentioned immediately above. That study would suggest that an even greater increase would be required, to approximate the earnings from outside jobs.

20 Unpublished reports of studies supported by the World Bank and the Inter-American Development Bank available on request from Dr William J Bicknell.

21 Geographic full-time means the faculty member's professional work is confined to the medical school and teaching hospital grounds even though their salary may be substantially or entirely derived from private practice.

22 Unpublished report from the USAID funded Cooperative Agreement to support the development of the Faculty of Medicine at Suez Canal University.

23 Personal observations of Dr Bicknell along with discussions with many medical educators from a number of developed and developing countries during the development of the Faculty of Medicine at Suez Canal University in Egypt in the 1980s.

24 For-profit or proprietary medical schools must be distinguished from not-for-profit schools typically part of a private non-profit university as in the United States and Canada. The history and risks of proprietary medical education were outlined vividly at the beginning of the 20th century by Flexner in Medical education in the United States and Canada. A report to the Carnegie Foundation for the Advancement of Teaching, Bulletin no. 4, Boston, D. C. upkyte, 1910, and more recently by Kern and L.udder in Time to Heal: A merican medical education from the turn of the century to the era of managed care, New York: Oxford University Press, 1999, pp. 371-2.

25 Secondary Medical School is a term used for Schools of Allied Health. There is no training of medical students at these schools.

26 In setting tuition fees as schools increase cost-recovery, it is very appropriate to use a cost figure that reflects realistic salary costs for faculty and staff. This is another argument in favour of adjusting personnel costs upward. This adjustment may also correct for under-reporting of revenue generation and its use as a salary supplement.

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Biographies

William J. Bicknell, M.D., M.P.H., is Professor of International Health, Socio-Medical Sciences, and Community Medicine at the Boston University School of Public Health. He founded the Center and
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Andrew C Beggs, MM, is an Instructor of International Health at Boston University School of Public Health. He teaches health care management and finance to health care professionals from developing countries. Beggs’ interests include cost analysis, human resource management, management of tuberculosis programmes, and the effect of microcredit on health.

Phi Van Tham, BSc, BA, MPH, is senior expert for medical training in the Department of Science and Training, Ministry of Health (MOH), Vietnam. He was himself a mathematics teacher in a medical school. Mr Tham’s responsibilities include health manpower planning, the economic aspects of health professional education and information technology for the health sector in Vietnam. He was the Secretary and a member of the Board of Directors of the Vietnam-Sweden Health Co-operation Health Training Support Project. Mr Tham is also secretary for Information Technology Development for the MOH and a board member for the MOH Human Resource Development Program supported by the European Commission. His research interests include the financing of medical education and health manpower development. (Address for Mr Tham: Department of Science and Training, Ministry of Health, 138A Giangvo Street, Hanoi, Vietnam)

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