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Cost Analysis of Establishing a Relationship Between a Surgical Program in the US and Vietnam

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''Twinning'' refers to a constructive partnership between hospitals in developed and developing nations. Such an effort may contribute immensely to capacity building for the developing nation, but one of the reasons given for the lack of sustainability is cost. We share a detailed operating cost analysis of our recent experience with an institution in Vietnam. We were awarded a 1-year $54,000 grant from the Vietnam Education Foundation (VEF) to conduct a live tele-video conferencing course on the ''Fundamentals of Clinical Surgery'' with Thai Binh Medical University (TBMU). In-country lectures as well as an assessment of the needs at TBMU were performed. Total financial assistance and expenditures were tabulated to assess up-front infrastructure investment and annual cost required to sustain the program. The total amount of direct money ($66,686) and in-kind services ($70,276) was $136,962. The initial infrastructure cost was $41,085, which represented 62% of the direct money received. The annual cost to sustain the program was approximately $11,948. We concluded that the annual cost to maintain a ''twinning'' program was relatively low, and the efforts to sustain a ''twinning'' program were financially feasible and worthwhile endeavors. ''Twinning'' should be a critical part of the surgical humanitarian volunteerism effort.

Key words: Twinning – Surgical global health – Vietnam – Global surgery

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Organizations throughout the United States have recently recognized the immense disparity and overwhelming burden of surgical diseases worldwide.[1–5] Academic institutions can play an important role in addressing these issues[2] because they have the ability to foster and nurture the altruistic nature of entering surgical residents. It is not uncommon to be asked by potential surgical candidates whether a surgical program offers the opportunity for international surgical volunteerism.

A multitude of academic organizations have successfully established relationships with several centers in sub-Sahara Africa.[2] Such constructive partnership between hospitals in developed and developing nations is often referred to as ''twinning.'' While nations in sub-Sahara Africa certainly deserve much of the world's attention, one should be cognizant that a significant proportion of Southeast Asian countries fare no better than those in Africa. Vietnam is one such nation.

Vietnam has a population of approximately 84 million people. Socioeconomically, it is mostly an agrarian society, although it is evolving from a centrally planned economy to a market economy.[6] Despite several socioeconomic improvements over the decades, Vietnam's 2010 gross national income (GNI) per capita based on purchasing power parity remained quite low at roughly $3070. In comparison, the 2009 GNIs per capita for Yemen, Angola, and Namibia were $2,500, $5460, and $6420, respectively.[7]

While many of the reported initiatives have focused on the process of establishing the groundwork for a ''twinning'' program, very few have addressed the financial aspect of not only how to start a program but also how to sustain it. In fact, cost has been given as one of the major reasons for the lack of sustainability. In this study, we present a cost analysis and provide an estimate of the annual cost that is required to sustain such a program. Because our program is relatively new, its effectiveness and educational impact will not be the primary focus of this report.

Materials and Methods

In 2009–2010, we received a $54,000 grant from the Vietnam Education Foundation (VEF)[8] to begin a live tele-video conferencing course on the ''Fundamentals of Clinical Surgery'' with Thai Binh Medical University (TBMU) in Vietnam. The purpose of this grant proposal was to assist Vietnam in capacity building of its medical education.

The Vietnam Education Foundation Act of 2000 (US Public Law 106–554) was established by several Vietnam veteran senators such as Senators John Kerry, John McCain, Bob Kerrey, Chuck Hagel, Charles Robb, Max Cleland, and Representatives George Miller and Lane Evans.[9,10] The Act was passed by the US Congress on December 20, 2000,[7] and VEF became an independent entity of the executive branch.[9]

VEF originated from the normalization process between the United States and Vietnam in 1997.[10] For the $146 million dollars owed to the United States by the defunct Republic of Vietnam (South Vietnam) just before the end of the Vietnam War, the current Socialist Republic of Vietnam agreed to assume this wartime debt as part of the normalization process.[10] The United States and Vietnam subsequently signed the bilateral trade agreement, which over time, resulted in Hanoi becoming a member of the World Trade Organization (WTO) and receiving the Permanent Normal Trade Relations (PNTR) status from the United States on December 29, 2006.[6]

Annually, Vietnam transfers millions of dollars to the US Treasury, of which $5 million is budgeted for VEF.[8] The mission of VEF is 2-fold. First is to establish an international fellowship program under which (a) Vietnamese nationals can undertake graduate and post-graduate level studies in the sciences (natural, physical, and environmental), mathematics, medicine, and technology in the United States; and (b) United States citizens can teach in the fields specified in subparagraph (a) in academic institutions in Vietnam. Second, VEF's purpose is to further promote the process of reconciliation between the United States and Vietnam and the building of a bilateral relationship serving the interests of both countries.[8]

As part of its mission, VEF offers several programs, one of which is the US Faculty Scholar Program. The goal of this program is to select US faculty to teach courses in English to students at Vietnamese universities either on-site in Vietnam or by interactive, real-time tele-video conferencing from the United States. In order to select the scholars, VEF engages the US National Academies to identify and select qualified US faculty.[8]

In 2009–2010, Quyen D. Chu, MD, and Hung Ho, MD, were 2 of the 3 US faculty who were selected for the VEF US Faculty Scholar award. As a joint effort between the Louisiana State University Health Sciences Center–Shreveport (LSUHSC-S) and the University of California–Davis School of Medicine,

the course ''Fundamentals of Clinical Surgery'' was delivered to the students at TBMU via real-time tele-video conferencing. The course allowed us to deliver didactics on basic surgical principles while interacting with and learning from the students and faculty at TBMU.

During September 2009, we visited TBMU to meet with the students and faculty. In-country lectures were also delivered to the students during this time. In addition, we spent an enormous amount of time assessing the needs of the school and hospital. During our initial fact-finding mission, we found that the TBMU medical library had a serious lack of current medical textbooks. Furthermore, there was a paucity of surgical instruments. The vascular surgeons lacked basic and advanced vascular instruments as well as surgical loupes. The mannequins that were used by the students on which to practice their basic skills had serious wear and tear. We used part of our grant to address these major deficiencies.

The course was delivered from February 2010 through June 2010. The first half of the course was delivered at LSUHSC-S and the latter half was given at the University of California–Davis School of Medicine. Because of the time zone difference (Vietnam is 12 hours ahead of Louisiana and 10 hours ahead of California), our live tele-video conferencing course was conducted mainly in the evening.

At the end of the course, we made a visit to the school to meet with the students and faculty to obtain feedback. In addition, we also gave in-country lectures. As part of capacity building in the field of surgery, we also embarked on having the book *Surgical Care at the District Hospital*, by the World Health Organization (WHO), translated and edited into Vietnamese. One hundred copies of this 600-plus page translation and 50 copies in CD form were freely distributed to the hospitals and medical schools throughout Vietnam. In addition, the e-book form of this book could be accessed freely through the VEF,[8] WHO,[11] and Global Health Web sites.[12] The cost of this pursuit was also included in the final cost analyses.

The cost of the volunteering effort made by faculty was calculated based on the percentage of effort multiplied by the institutional base salary full-time equivalent (FTE). LSUHSC-S had an interest in developing an international relationship with other institutions. Through a generous grant from the LSUHSC-S Foundation, LSU provided financial assistance to our endeavor.

Table 1 Source of financial assistance

Source of financial assistance	Amount
VEF	$54,000
US institution	$12,686
Subtotal	$66,686
In-kind services	
Covidien donations	$22,370
Ethicon donations	$3370
Donated effort from surgical faculty	$44,536
Subtotal	$70,276
Total	$136,962

Results

The course was delivered to 50 senior students who were selected based on their proficiency in the English language. There were 16 tele-video conferencing sessions, with each session lasting approximately 2 hours, giving a total of 32 hours of tele-video conferencing contact hours. The presentations were videotaped and archived to be reused. In addition, the in-country lectures and contact hours totaled about 16 hours. The source of financial assistance is listed in Table 1. The total amount was approximately $136,962. This amount takes into consideration both direct money received ($66,686) and in-kind services ($70,276). The bulk of direct money received was provided by VEF ($54,000), while institutional support was in the amount of $12,686. In-kind services were defined as non-cash items; these included the worth of equipment donated by industries ($22,370 from Covidien and $3370 from Ethicon) and our volunteering time and effort ($44,536).

The Internet capacity was upgraded from 512 kB to 12 MB and the cost of having adequate Internet bandwidth was approximately $200 per month. Tele-video conferencing equipment included the Sony PCS-G50 Video Communication System (Sony, City, Japan), Sony PCS-G70 Camera (Sony, Hauppange, NY), Sony LCD Projector VPL-CX 76 (Sony, Hauppange, NY), screen and TOA Electronics audio equipment (TOA Corp., Kobe, Japan).

Table 2 itemizes the cost breakdown for the entire project. Note that a significant amount of money ($12,686) was required for the initial infrastructure support; roughly $6000 of which was necessary for tele-video conferencing equipment, $2530 for upgrading capacity for fast Internet access, and over $1500 for course materials and supplies for approximately 50 students. Technical assistance, administrative support, and interpreter collaboration

Table 2 Itemized annual cost

Tele-video conferencing costs	Amount
Tele-video conferencing equipment	$6016
Technical assistance	$800
Administrative support	$460
Interpreter	$720
Fast Internet access	$2530
Course materials and supplies	$1560
Subtotal	$12,686
Flight/food/lodging for 2 surgical faculty (5 flights)	$13,445
Translation of WHO book *Surgical Care at the District Hospital*	$4000
Print translated books (×100)	$2102
Books	$9142
Surgical equipment	$23,311
Shipping	$2000
Subtotal	$54,000
Total	$66,686

incurred costs of approximately $800, $460, and $720, respectively.

There was a serious lack of modern textbooks in the medical school library. To address this problem, over $9000 worth of textbooks were purchased and donated to the school. Also, there was a critical shortage of adequate surgical equipment for a hospital that cares for about 2.8 million of its inhabitants. Approximately $23,000 worth of surgical equipment, many of which were vascular instruments, was donated to the medical school and hospital. The cost of having the *Surgical Care at the District Hospital* book translated into 100 hard copies and 50 CDs totaled over $6000. Finally, the cost of 5 roundtrips to and from Vietnam, including food, in-country travel, and lodging, amounted to $13,000; the total cost for shipping supplies was about $2000.

Corporate donations from Covidien and Ethicon represented 18.8% of the total amount of money. The in-kind donations included the Ligasure equipment from Covidien, stapling devices from Covidien and Ethicon, and operating room supplies from LSUHSC-S. The initial infrastructure cost was $41,085; this represented 62% of the direct money received. Travel expenses, which included food, lodging, airline tickets, and other incidental expenses for surgical faculty averaged $2689 per person.

To have a better understanding of what it would cost to sustain the project for the following year, we have included the budget that was accepted for our renewed grant; the annual cost was approximately $11,948 (Table 3).

Table 3 Estimated annual cost to sustain a ''twinning'' program

Items	Amount
Administrative support	$2300
Interpreter support	$960
Translation handout	$4000
Technical assistance	$800
Course supplies/materials for 50 students and books	$3600
Video recording	$288
Total	$11,948

Discussion

Traditionally, global health disparities have been associated with communicable and infectious diseases. Surgically correctable diseases have not been given their due process in the realm of global health disparities. Farmer and Kim framed the issue best when they stated that surgery is the ''neglected stepchild of global health.''[13] Surgical conditions contribute significantly to the disease burden of the world population.

Vietnam is among the poorest nations in the world with a significant burden of surgical diseases. Despite a relatively stable government for the past 35 years, Vietnam continues to struggle with delivering health care for its 84 million inhabitants. Assistance from developed nations such as the United States can greatly alleviate some of this burden.

In 2009, we received a generous grant from the VEF. In preparing for the grant, we realized that there was a paucity of data on the financial aspect of starting a ''twinning'' program. Therefore, we made a conscientious decision to closely itemize our expenditures in hope to relay our experiences to others. This article is the culmination of such experience over the past year.

As one can see, the majority of the money was used to strengthen the infrastructure of TBMU. A significant amount of money was used to upgrade the library with modern textbooks and purchase sorely needed surgical instruments. Additionally, we discovered that there was not a practical surgical textbook to assist health care personnel in remote regions of Vietnam. To address this, we assisted with the editing and translation of the book, *Surgical Care at the District Hospital*, produced by WHO. This effort was supported by the International College of Surgeons. Although the book was written in 2003, we felt that there were sufficient basic surgical principles that remained applicable and practical to Vietnam. Furthermore,

since the book was published not for profit, permission for its translation did not require any complex legal maneuvering.

The in-kind donation was to assist TBMU with its surgical infrastructure. As reported, we found that the initial cost to begin a ''twinning'' program can be significant. However, sustaining such a program requires less than $12,000 annually. Although the actual figure will vary depending on the region, we believe that our figure can serve as a reference point for those who might be interested in starting a ''twinning'' program. Certainly, this figure can be higher if other costs such as the in-kind donation or the ''donated faculty'' time are included. However, the $12,000 figure represents the direct cost that would be required for an institution to maintain a ''twinning'' program. Given the low cost, we believe that it is reasonable for any surgical program to begin and sustain such a program. ''Twinning'' programs can be mutually beneficial to both the developed and developing nations. For surgeons and surgical residents in the United States, exposure to a variety of surgical pathologies can be gained just by caring for the patients, many of whom have some of the most complex disease processes.

Evaluating the effectiveness of our ''twinning'' program at this early stage can be a difficult task for multiple reasons. The language barrier is the major challenge; an hour lecture that would normally be delivered for English-proficient students is stretched to 3 hours for students who are not proficient in the English language. Diseases that are commonly seen in the United States (*e.g.*, diverticulitis) can be a rarity in developing nations, and therefore, the level of enthusiasm among the learners may be greatly diminished. Other difficulties include logistic challenges as a result of time-zone differences as well as difficulties matching a curriculum that will cater to a heterogeneous population of students from a myriad of educational backgrounds. Although effectiveness can only be assessed on a long-term basis, the financial feasibility of setting up such a program can still be evaluated. For future programs, we plan to deliver pretests and posttests for each topic to assess the effectiveness of our program. For example, before delivering the breast cancer lecture, we would give a 10-question pre-lecture test a week before the lecture and a post-lecture test immediately after the lecture, and then another post-lecture test a week after the lecture. This will not only give us an idea of whether the students understand the materials, but also how well they retain them. Finally, we will deliver an evaluation form following each lecture to better gauge how we are doing as lecturers.

Our long-term plan is to develop a program whereby our surgical residents will have the opportunity to accompany the faculty to Vietnam and not only learn the Vietnamese culture and medical system but also be able to participate in the care of the patients. We believe this will provide a broader and more global perspective for our students, which will ultimately enrich their surgical experience.

Starting a ''twinning'' program requires the willingness and support of the major decision makers of an institution such as the chancellor, the dean, and the chairman. Without such support, it may be a very difficult endeavor for the faculty. The faculty should also be aware of the specific rules and regulations of the collaborating nation and understand potential barriers that might prevent developing a ''twinning'' program quickly or at all.

Summary

We believe that surgical volunteerism is a laudable endeavor. Academic centers should consider incorporating a ''twinning'' program as part of their curriculum. Such programs have the potential to be mutually beneficial for the twinning institutions. Concerns for the high cost of starting and maintaining such a program may be unfounded.

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