Career intentions of medical students in the setting of Nepal’s rapidly expanding private medical education system

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The number of medical students trained in Nepal each year has increased nearly fifty-fold in the last 15 years, primarily through the creation of private medical schools. It is unknown where this expanding cohort of new physicians will ultimately practice. We distributed an anonymous survey to students in their last 2 years of medical school at four medical schools in Nepal to examine two dimensions of career intention: the intention to practice in Nepal and the intention to practice in rural areas. Eighty-five per cent of the eligible study population participated, for a total of 469 medical students. Of these, 88% thought it was likely they would practice in Nepal and 88% thought it likely they would practice in urban areas. Those students who indicated a greater likelihood of practicing abroad came from families with higher incomes, were more likely to think earning a good salary was very important to their decision to become a physician, and were less likely to think they could earn a good salary in Nepal. Students whose tuition was paid by the government were no more likely to indicate an intention to practice in Nepal than students paying their own tuition at private medical schools. Students who indicated a greater likelihood of practicing in rural areas were more likely to be male, to have gone to a government secondary school, to have been born in a village, or to have received a scholarship from the Ministry of Education that requires rural service. Based on our findings, we suggest the following policy changes: (1) medical schools consider selecting for students from rural backgrounds or government secondary schools who are more likely to intend to practice in rural areas, and (2) increase the number of post-graduate positions—weighted toward rural health needs—to retain students in Nepal.

Keywords Nepal, physician migration, medical education, rural practice

KEY MESSAGES

- Most of the medical students surveyed thought they would practice in Nepal and in urban areas after graduation.
- Economic motivations were associated with an intention to practice abroad. Several background demographics were associated with an intention to practice in rural areas.
- The study data can be used to help design scholarship programmes and postgraduate training programmes to help strengthen Nepal’s health care delivery system.
Background

As a low-income country (World Bank 2009) with a population that is more than 80% rural (Central Bureau of Statistics 2007), Nepal faces significant health care challenges. The difficulty of providing basic public health and primary care to an often remote and impoverished population in a rugged landscape is compounded by a lack of trained health workers, including physicians. Nepal’s physician shortage is particularly pronounced in rural areas, where it is estimated that the physician ratio is 2.4 physicians per 100,000 people (Butterworth et al. 2008), about 100 times lower than is considered the minimum acceptable ratio by the World Health Organization (WHO 2006). The ability to train, retain and sustain a skilled physician workforce will play an important part in Nepal’s efforts to strengthen an already fragile health care system.

Since Nepal ended its political and economic isolation in the mid-twentieth century, its health care system has been the focus of many governmental and non-governmental capacity building projects (Justice 1989). Formal training of medical professionals began in 1978 with the opening of the government-run Institute of Medicine (IOM) in the capital city of Kathmandu. The IOM’s mission was to train Nepali physicians to meet the health needs of a rural and poor population, and many of the IOM’s initial students were first community health workers who came to Kathmandu to obtain Bachelor of Medicine and Bachelor of Surgery (MBBS) degrees and then returned to their communities. Gradually, the IOM shifted focus to a more internationally standardized curriculum, and through the 1990s the IOM graduated about 20–30 physicians per year with a British-model MBBS degree (Dixit 2005). These IOM physicians were the only physicians trained in Nepal until the mid-1990s, when the Nepal Medical Council allowed the creation of another government-sponsored school and the establishment of multiple private medical schools. Fifteen years later, there are now about 1400 first-year medical students enrolled in 14 medical schools in Nepal, of whom 77% are private medical students (statistics from Nepal Medical Council, 2009).

Medical students in Nepal enter medical school after 12 years of primary and secondary school. Secondary schools are either free government schools, which predominate in rural areas or in urban areas among low-income families, or they are private fee-based institutions. Medical education in Nepal is a 5½ year curriculum based on the British medical education model. Admission at the private medical schools is based on test scores, secondary school marks, an interview and ability to pay (Dixit 2003); admission at the government school is based only on a multiple choice exam. Upon completion of 2 years of pre-clinical education and 2½ years of clinical clerkships, students receive a MBBS degree. One year of internship is required to sit for the Nepal Medical Council licensing exam, after which the graduate is licensed to practice medicine in Nepal. Since 2006, the pass rate on this exam has ranged from 47–76% and was most recently 60% (statistics from Nepal Medical Council, 2010). To specialize further, newly graduated doctors must complete postgraduate training of several years, either in Nepal or abroad. English is the primary language of instruction at all medical schools in Nepal.

To address the issue of low physician density in rural Nepal, Nepal’s Ministry of Education (MOE) has instituted a scholarship programme in which Nepali-owned private medical schools must reserve 10% of each class for the free education of students who score at the top of a standardized national exam (Indian-owned medical schools in Nepal must reserve 20% of their classes for this programme). The government provides no funding for this mandate; costs of educating MOE students are part of the schools’ general operating budgets. In return for these scholarships, students are obligated to serve 2 years in a remote rural area following graduation. Private medical education in Nepal is relatively expensive; tuition at the three private medical schools averaged about US$31000 for the 5½ years of training, which is about 30 times the average per capita share of GDP in Nepal (UNDP 2009). By contrast, government subsidized tuition fees at the IOM are only about US$2400 for the same 5½ year programme. IOM students and MOE students receive no further assistance beyond tuition subsidies, and all rely on family contribution for other expenses.

New physicians enter a health system structured around private hospitals in urban areas and government-run district hospitals and health posts in the more remote areas. Apart from free or subsidized care at government clinics, there is no public health insurance, and private health insurance is extremely rare. Medical care at private institutions is almost entirely out-of-pocket. The per capita government spending on health care is US$24 per year (UNDP 2009).

This expansion of medical education in Nepal presents an instructive test case for whether a rapid increase in physician supply largely via the private sector can effectively meet the health system needs of a developing country. For this policy to work, newly graduated physicians must not only be convinced to avoid the global physician migration pipeline to the developed world, but also to choose to go to resource-poor settings within their own country. Physicians are drawn to practice locations where they will maximize their remuneration, as described by Mullan (2002) in his ‘white-follows-green law’. Neo-classical economics theory underscores this idea by explaining that migration patterns are caused by differences in wage rates between locations, suggesting that migration is mainly an individual decision taken to maximize income. Newer theory suggests migration decisions are based on a family’s choice to diversify risk and distribute human capital across several markets (Stark 1991). In the case of young graduates from medical school, it is likely that families participating in the tuition investment may also influence the decision of where the new physician will make a career.

To understand these ‘push–pull’ factors that drive the patterns of global migration, studies have begun to examine the views of medical students in ‘donor’ countries through focus groups (Hagopian et al. 2005) and through surveys in India (Rao et al. 2006), Lebanon (Akl et al. 2008), South Africa (Dambisya 2003) and Mozambique (Sousa et al. 2007). Factors that seem to be pushing students toward emigration include poor remuneration in ‘donor’ countries, poor working conditions (including access to water, electricity, supplies,
equipment, and drugs), limited academic/training opportunities and political instability. In countries with particularly high rates of emigration, these studies have found a ‘culture of medical migration’, in which various institutional factors help to influence recently graduated physicians toward work abroad (Hagopian et al. 2005). Nepal is not currently a country with high rates of medical emigration—a study from 2005 found only 54 Nepali trained physicians in four Western countries (Mullan 2005)—but it remains to be seen if rapid medical school expansion reverses Nepal’s status from an historical importer to now exporter of human resources for health.

The urban and rural maldistribution of physicians is an issue faced in the developed world—many of the physician migrants from poor countries find themselves in shortage areas in Western countries—but it is an especially difficult problem in a poor country like Nepal. In the West, factors that seem to correlate with practice in rural areas include having been brought up in a rural area, having a spouse/partner with a rural background, attending school in a rural area, receiving rural medical training, participating in a rural medicine loan repayment programme (Brooks et al. 2003; Laven and Wilkinson 2003), international medical graduate status (Hagopian et al. 2004; Thompson et al. 2009) and gender (Ellsby et al. 2002). Barriers to rural practice include financial compensation, professional isolation, limited educational opportunities for self and family, and lack of specialty support (Brooks et al. 2002). In Nepal, a qualitative study of rural generalist physicians identified many of these same factors (Butterworth et al. 2008).

While our findings about the strong migration intention of Nepali physicians mirror findings from several other low-income countries, the unique contribution of this paper is the examination of these intentions in a country with an entirely new medical education system, and where the system has built-in incentives for the rapidly expanding private school market to admit high-achieving students who might otherwise not be able to attend medical school through a mandatory scholarship programme. To examine the future of the Nepali physician workforce, we surveyed Nepali medical students in their last 2 years of medical school about where they think it is likely they will practice and about their views on medicine both in Nepal and abroad.

### Methods

We conducted this survey in 2009 at the four medicals schools located in the Kathmandu Valley. The Kathmandu Valley contains the capital city, Kathmandu, and is the centre of the nation’s medical training and health care delivery. Of the four medical schools, three were private medical schools started in the last 10 years: Kathmandu Medical College (KMC), Kathmandu University School of Medical Science (KUSMS) and Nepal Medical College (NMC). The fourth medical school was the IOM (Table 1). The research committees at all four Nepali medical schools as well as at the investigator IH’s home institution, Weill Cornell Medical College, approved the study protocol.

Our study was conducted with students in their final 2 years of the 4½ year curriculum to obtain a MBBS degree. In seven of the eight participating classes of medical students, we approached a convenience sample of students at the conclusion of their regularly scheduled lecture classes, and the anonymous surveys were returned immediately to study investigators. The final year class from NMC did not meet as a class during our study period, so students were approached in small groups during their separate clinical clerkships, and we collected surveys during a mid-day break. No effort was made to approach students who did not attend the selected lecture class or clerkship posting. As a token of appreciation, a penlight was given to every student approached regardless of participation.

The questionnaire was based on previous surveys conducted among nursing students in the developing world (Nguyen et al. 2006) and among medical students in India (Rao et al. 2006). Additional questions specific to the Nepali context were added. The questionnaires assessed basic demographics, likelihood of practice in different locations, intention to emigrate to various countries, reasons for choosing medicine as career, and attitudes toward practice both in Nepal and abroad. Students who were not Nepali citizens were excluded from subsequent analysis. These foreign students were either Indian, Sri Lankan or Maldivian students, and had come to Nepal for their medical education before returning to their home countries or a third country to practice. For the purposes of reporting and analysis, all attitude questions were converted from a 1–5 Likert scale to two categories: ‘agree’, which

### Table 1 Characteristics of the participating medical schools

| Kathmandu Medical College | Kathmandu University School of Medical Sciences | Nepal Medical College | Institute of Medicine |
|---------------------------|-------------------------------|----------------------|----------------------|
| Funding                   | Private                       | Private              | Private              | Government                 |
| Affiliated university     | Kathmandu University          | Kathmandu University | Kathmandu University | Tribhuvan University       |
| First enrolled MBBS students (year) | 1997                         | 2001                 | 1997                 | 1978                       |
| Number of Nepali medical students in the last 2 years of medical school | 182                          | 90                   | 197                  | 84                         |
| Total 5.5 year medical school tuition cost for entering students (US dollars) | 35,422                       | 24,523               | 34,022               | 2366                       |

Note: Costs were converted from Nepali Rupees to US dollars on 1 December 2009 at $1 = 73.4 NRs.

Source: Administrators at the respective institutions.
combined 5 (strongly agree) and 4 (agree), and ‘disagree’, which combined 3 (neither agree nor disagree), 2 (disagree) and 1 (strongly disagree). Bivariate analyses to detect associations between students’ preferences for practice locations and their survey responses were conducted using logistic regression, with a binary indicator of geographical practice preference as the dependent variable. A subset of the survey questions was identified prior to analysis as ones of a priori interest. The results from these analyses are reported in this paper, regardless of statistical significance. We assumed that all missing data, whether from unanswered questions or from students who did not fill out a survey, were missing at random. We ran a multivariate analysis, adjusting rural practice intention for the eight significantly associated demographic variables found in the bivariate analysis. Statistical analysis was performed using Stata Intercooled version 10.1 (Stata, College Station, TX).

Results
Sample characteristics
A total of 469 responses were collected from Nepali students out of 553 possible participants (85%) across the four medical schools. An additional 33 surveys were collected from non-Nepali medical students and these were not included in the analysis. An individual in the study population (Table 2) was more likely to be born in a city than in a village (73% vs 27%) and to have gone to a private secondary school rather than a free government secondary school (95% vs 5%). Of the 21 students in the study who went to a free government secondary school, ten attended the IOM. Fifty-five per cent of the students came from the Central administrative district, which encompasses Kathmandu. All students were single and the median age was 23 years. Females comprised 39% of the total study population, but only 8% of the population at the IOM, where admittance is determined solely by an entrance exam. Seventy-four per cent of the students reported a relative in a Western country and 45% said they had a family member who was a physician. Tuition was primarily paid by family contributions (83% of the students), as well as scholarships (12%) and loans (4%).

When students were asked where they thought they would practice during their medical careers, 88% reported it very likely or likely they would practice in Nepal, while 52% thought it very likely or likely they would practice abroad (Table 3). Questions about future practice location were asked separately, so students potentially could list both Nepal or abroad as ‘likely’. Sixty per cent of the students ranked Nepal as more likely practice location than abroad on a 5-point Likert scale, 24% ranked these options as the same and 16% ranked abroad as more likely than Nepal (shaded area in Table 3). Table 4 displays how likely students thought it was that they would practice in either urban (88%) or rural locations (48%). Fifty-eight per cent of the students ranked an urban location as more likely than a rural location, 29% ranked these options as the same and 14% ranked rural as more likely than urban (shaded area in Table 4).

Students were also asked whether they had thought about emigrating or had plans to emigrate to specific countries (Figure 1). The United States (US) was the most popular potential destination country, with 53% of the students having at least thought of emigrating there. Of students who at least thought they would emigrate to another country, 94% thought they would return to practice in Nepal, with a median return time of 8.5 years.

Regarding attitudes toward going abroad (Figure 2), one in four students agreed moving abroad had been a desire since childhood, and 9% of students said the opportunity to move abroad was very important to their decision to go to medical school. However, in looking at factors that drive the desire to emigrate, 75% of Nepali students agreed they need to leave Nepal to get enough training in their field, and only 33% agreed that there were enough postgraduate positions in Nepal for everyone who wants one. In addition, 63% of students agreed the recent political situation in Nepal makes emigration more necessary, and 54% agreed that Nepal’s government is likely to be unstable in the future. Seventy-four per cent of students agreed that there are greater opportunities for physicians to make money in the US. However, 65% of students agreed they could make a good salary practicing in Nepal.

Other factors that would keep Nepali students in Nepal included a sense of obligation; 84% of students agreed they have a duty to the people of Nepal to practice in the country. Students also recognized their obligation to the unmet needs of rural Nepal, with 63% of students agreeing that a period of service in rural areas should be made mandatory for all Nepali physicians. Two in three (67%) students admitted that additional payments from the government would make them more likely to practice in a rural area.

Bivariate analysis
For the purpose of bivariate analysis, we defined ‘intention to practice abroad’ as those students who ranked practice abroad as more likely than practice in Nepal (n = 73) compared with those students who ranked abroad and Nepal as equal or Nepal as more likely than abroad grouped together (n = 375). Similarly, if a student ranked practicing rurally as more likely than practicing in an urban area, we defined them as having an intention to practice in a rural setting. Sixty-two students indicated an intention to practice rurally compared with 391 students who indicated that practicing in an urban setting was equally or more likely than practicing in a rural setting. Only two students were in both the abroad intention group and rural intention group.

Several demographic factors were associated with intent to practice abroad (Table 5). Odds of intention to practice abroad were more than three times higher [odds ratio (OR) 3.3; 95% confidence interval (CI) = 1.6–6.7] for those in the highest family income bracket as compared with the lowest, and almost three times higher (OR 2.8; 95% CI = 1.5–5.5) for those who reported their pre-medical school performance to be excellent compared with those who said their performance in medical school was only average. Odds were twice as great that students would intend to practice abroad if their self-assessed medical school performance was excellent, compared with those who rated themselves only average (OR 2.1; 95% CI = 1.3–3.6).

Whether a student’s tuition was paid by the government (n = 114) or by his/her family (n = 350) at a private school
Table 2  Descriptive statistics of the study population

| Answers                                      | Number (%) |
|---------------------------------------------|------------|
| Nationality                                 |            |
| Nepali                                      | 469 (93.4) |
| Indian                                      | 25 (4.9)   |
| Sri Lankan                                  | 4 (0.8)    |
| Maldivian                                    | 4 (0.8)    |
| Medical school                              |            |
| KMC                                          | 151 (32.2) |
| KUSMS                                        | 83 (17.7)  |
| NMC                                          | 163 (34.8) |
| IOM                                          | 72 (15.4)  |
| Year in school                              |            |
| Final year                                  | 227 (48.4) |
| Second to final year                        | 242 (51.6) |
| Sex                                         |            |
| Male                                        | 287 (61.3) |
| Female                                      | 181 (38.7) |
| Marital status                              |            |
| Single                                      | 466 (100)  |
| Place of birth                              |            |
| Village                                     | 122 (26.9) |
| City                                        | 333 (73.2) |
| Administrative district of birth             |            |
| Far Western                                 | 10 (2.1)   |
| Mid Western                                 | 11 (2.3)   |
| Western                                     | 102 (21.8) |
| Central                                     | 258 (55.0) |
| Eastern                                     | 49 (10.5)  |
| Secondary schooling                         |            |
| Government school                           | 21 (4.6)   |
| Private school                              | 441 (95.4) |
| Family income (per year, US dollars)        |            |
| <$2600                                      | 149 (34.9) |
| >$2600 and <$6600                           | 186 (43.6) |
| >$6600                                      | 92 (21.6)  |
| Received a Ministry of Education scholarship (KMC, KUSMS, NMC only) | | |
| Yes                                         | 43 (11.0)  |
| No                                          | 350 (89.0) |
| Relative in one of the following areas: US, UK, Canada, Australia, European Union other than UK | |
| Yes                                         | 348 (74.8) |
| No                                          | 117 (25.2) |
| Relative who is a doctor                    |            |
| Yes                                         | 207 (44.9) |
| No                                          | 254 (55.1) |
| Median age (range)                          | 23 years (20–31) |

Notes: The category ‘Nationality’ reports responses from all 502 study participants. All subsequent categories report responses only from the 469 Nepali participants. Categories may not total 469 because of missing data.

KMC = Kathmandu Medical College; KUSMS = Kathmandu University School of Medical Sciences; NMC = Nepal Medical College; IOM = Institute of Medicine.

Source: Survey of 469 students in their final year or two of four medical schools in the Kathmandu Valley in Nepal.

appeared to make no difference as to whether they thought they were likely to practice abroad (OR 1.1; 95% CI = 0.6–2.1).

Table 5 also displays factors associated with an intention to practice in rural areas. These include male gender (OR 2.0; 95% CI = 1.1–3.7), a reported government secondary school background (OR 5.8; 95% CI = 2.3–14.7), being born in a village (OR 3.2; 95% CI = 1.8–5.6) and receiving an MOE scholarship (OR 4.4; 95% CI = 2.1–9.1). Rural-bound students were less likely to be in the self-assessed middle (OR 0.5; 95% CI = 0.3–0.9) or highest family income bracket (OR 0.37; 95% CI = 0.2–0.9) as compared with the lowest income bracket, and were less likely to have a relative who is a physician (OR 0.5; 95% CI = 0.2–0.6) or living in the West (OR 0.4; 95% CI = 0.2–0.6). Although only eight students in total (1.7%) indicated a possibility of doing a medical doctorate in general practice as postgraduate training—a programme similar to a family medicine residency with expanded surgical training (Butterworth et al. 2008)—four of these eight indicated an intent to practice in rural areas (OR 5.6; 95% CI = 1.2–27.4).

Intention to practice abroad was associated with increased odds of indicating that the opportunity to go abroad (OR 6.3; 95% CI = 3.2–12.5) and to earn a good salary (OR 2.8; 95% CI = 1.7–4.8) were ‘very important’ to their decision. These students also had 3.5 times the odds of indicating that the desire to improve the health of the population was ‘not important’ to their decision (95% CI = 1.7–7.2). There were no
statistically significant associations between the rural intention students and any of the examined influencing factors: prestige of the profession, family influence, desire to improve the health of the population, chance to go abroad, chance to earn a good salary, and interest in science. As shown in Table 6, an increase in the odds of a student’s intention to go abroad was associated with an agreement with these statements in the survey: “I need to leave Nepal to get enough training in my field” (OR 3.3; 95%
CI = 1.5–7.5), “Nepal’s government is likely to be unstable in the future” (OR 2.1; 95% CI = 1.2–3.7), and “The political situation in Nepal in the last 15 years has made leaving the country more necessary” (OR 2.5; 95% CI = 1.4–4.6). Students who indicated an intent to practice abroad were six times more likely to agree that moving abroad has been a desire since childhood (95% CI = 3.6–10.5). They were also significantly less likely to believe that they had a duty to the people of Nepal to practice in Nepal (OR 0.4; 95% CI = 0.2–0.6) or that they could earn a good salary in Nepal (OR 0.5; 95% CI = 0.2–0.9). Students who preferred rural practice had different attitudes compared with those intending to go abroad in most categories, although many of these were not statistically significant. Students intending to practice in rural areas were more likely to agree that they had a duty to the people and that a period of rural service should be made mandatory for all Nepali physicians, than students intending to practice in urban areas (OR 2.2; 95% CI = 1.1–4.2). They were less likely to agree that they would feel isolated in a rural area (OR 0.4; 95% CI = 0.2–0.8).

A bivariate analysis of demographic characteristics associated with being a MOE scholar is shown in Table 7. This exam-based scholarship programme selected a group of students who, compared with their private school peers, were more likely to be male (OR 2.5; 95% CI = 1.2–5.1), less likely to be in the middle income bracket than the lowest income bracket (OR 0.4; 95% CI = 0.2–0.9), and less likely to have a relative in the West (OR 0.3; 95% CI = 0.2–0.6) or to have a relative who was a physician (OR 0.5; 95% CI = 0.2–0.9). As expected, MOE scholars were much more likely to self-report an excellent qualifying score in the pre-admission exam (OR 6.3; 95% CI = 2.9–12.5), and this self-reported success continued into ‘excellent’ self-reported medical school performance (OR 6.7; 95% CI = 2.0–22.4).

**Multivariate analysis**

We were concerned that the presence of MOE students, who have a dedicated service obligation, was confounding the observed relationship between intention to practice rurally and some of the survey responses, and that some other
between-variable relationships may have also been affecting the
demographic associations. We constructed a multivariate model
(Table 8) to examine intention to practice rurally; this
contained all eight of the significantly associated demographic
variables found in Table 5. The only demographic variables to
retain significance in this multivariate analysis were being born
in a village (adjusted OR 2.6; 95% CI = 1.2–4.9) and having
gone to a government school (adjusted OR 5.2; 95% CI = 1.7–
15.5). As might be expected, MOE scholarship students were
still strongly associated with intention to practice rurally
(adjusted OR 5.0; 95% CI = 1.7–14.0). Gender, family income,
status as a private paying medical student, having a relative
abroad, and having a relative who is a doctor, all lost
significance in the multivariate model.

Discussion
This is the first study of the attitudes and career goals of a
rapidly growing population of Nepali medical students. Overall,
about one-quarter of the estimated 2100 medical students
across Nepal in their final 2 years participated, and in our study
population in the Kathmandu Valley, the response rate was
85%. The great majority of medical students in Nepal appear to
intend to practice in urban Nepal; far fewer thought it was
likely they might either go abroad or practice in rural areas of
Nepal. Different types of factors seem to be driving students
either abroad or into rural areas. Attitudes toward finance
seemed to influence the intent to go abroad. The only
demographic characteristic predicting intent to go abroad was
being in the wealthiest family income bracket. Other demo-
graphic factors—gender, village birth, district area, type of
secondary school, MOE scholarship status and even already
having a relative in the West—were not associated with the
self-perceived likelihood of going abroad. The association with
high family income could be expected because of the resources
required to apply for positions abroad; for example, applying for
residency in the US requires computer tests and travelling to
the US for a clinical exam and residency interviews, estimated
to cost US$10 000–12 000 by medical student informants.
Students who thought they would go abroad were significantly
more likely to indicate that having a good salary was important
to their decision to become a physician, and that they could not
make a good salary in Nepal. Another characteristic associated
with intent to go abroad was higher self-assessed pre-medical
and medical school performance, which is consistent with
literature suggesting the best students, often from the best
medical schools, are more likely to migrate from South Asia
(Kaushik et al. 2008).

Table 5 Bivariate analysis of factors associated with preferring abroad and preferring rural areas.

| Factors’ association with the intention to practice abroad | Factors’ association with the intention to practice in a rural setting |
|----------------------------------------------------------|----------------------------------------------------------|
| Odds ratio | 95% confidence interval | n | Odds ratio | 95% confidence interval | n |
| Male | 1.5 | 0.9–2.5 | 447 | 2.0 | 1.1–3.7 | 452 |
| Government secondary school | 1.9 | 0.7–5.4 | 445 | 5.8 | 2.3–14.7 | 450 |
| Village birth | 0.8 | 0.5–1.5 | 435 | 3.2 | 1.8–5.6 | 439 |
| Family income (US dollars) | | | 408 | | 412 |
| <$2600 | 1 | – | 138 | 1 | – | 139 |
| >$2600 and <$6600 | 1.9 | 1.0–3.7 | 181 | 0.5 | 0.3–0.9 | 183 |
| >$6600 | 3.3 | 1.6–6.7 | 89 | 0.4 | 0.2–0.9 | 90 |
| Qualifying exam performance | | | 438 | | 443 |
| Average | 1 | – | 184 | 1 | – | 186 |
| Above average | 1.6 | 0.9–3.0 | 168 | 1.3 | 0.7–2.3 | 171 |
| Excellent | 2.8 | 1.5–5.5 | 86 | 1.3 | 0.6–2.6 | 86 |
| Medical school performance | | | 440 | | 445 |
| Average | 1 | – | 271 | 1 | – | 276 |
| Above average | 2.1 | 1.3–3.6 | 149 | 1.2 | 0.7–2.1 | 151 |
| Excellent | 1.7 | 0.6–5.5 | 20 | 1.3 | 0.4–4.8 | 18 |
| Ministry of Education scholarship | 0.8 | 0.3–2.0 | 380 | 4.4 | 2.1–9.1 | 383 |
| Self-paying private medical school students | 1.1 | 0.6–2.1 | 443 | 0.3 | 0.2–0.6 | 448 |
| (vs MOE and IOM students) | | | | | |
| Final year of medical school | 0.9 | 0.6–1.5 | 448 | 1.1 | 0.6–1.8 | 453 |
| Relative who is physician | 1.3 | 0.8–2.1 | 441 | 0.5 | 0.3–0.9 | 447 |
| Relative who is in the West | 1.8 | 0.9–3.5 | 445 | 0.4 | 0.2–0.6 | 449 |

Note: Odds ratios greater than 1 indicate an increased likelihood of practicing abroad (compared with practicing in Nepal) or of practicing in a rural setting (compared with an urban setting). Values in bold are statistically significant (P < 0.05).

*These results lost significance when adjusted for in the multivariate analysis displayed in Table 8.

MOE = Ministry of Education; IOM = Institute of Medicine.

Source: Survey of 469 students in their final year or two of four medical schools in the Kathmandu Valley in Nepal.
The most popular destination country for migration in this survey was the US, a finding similar to that of Rao et al. (2006) among Indian medical students. Australia was the next most popular, followed by the UK. In Rao et al.’s study, 5% of the Indian medical students had thought about going to Australia, compared with 23% among the Nepali medical students in this study. This may reflect differences between Nepal and India, or the increasing popularity of Australia, since Rao et al.’s study was completed in 2005. In the UK, recent policy changes have made it more difficult for South Asian medical students to emigrate. Of the Nepali students who had plans to go to the UK, 76% had a family member already in that country.

In contrast to students who thought they would go abroad, multiple demographic factors were associated with students who thought they would practice in a rural area. They were more likely to be male, to be born in a village, to have gone to a government school, and to have a lower family income, and their relatives were less likely to be abroad in the West or already physicians. This suggests student background could be predictive of future intent to go to (or return to) rural areas to practice medicine, a finding similar to research among rural physicians in the West (Brooks et al. 2002). These students saw themselves as having a duty to the people of Nepal and tended to have a more optimistic view of politics in Nepal than urban intention students.

The MOE programme mandates that private medical schools provide free tuition to 10–20% of their students—which in turn increases the tuition costs of the other private medical students—and yet little is known about the ultimate effectiveness of this programme. MOE students, who are obligated to serve 2 years in rural areas, were more likely to say they would practice in a rural area. However, there was no difference between MOE scholars and private school students with regards to self-assessed likelihood of going abroad. This implies that the MOE programme may be effective in the short-term by forcing students into rural areas, but whether these students ultimately stay in rural areas beyond their 2-year obligation, or even stay in Nepal in the long term, should be tracked by the government. Evidence from Africa indicates strategies to attract health workers to rural areas may need to be tailored to specific health worker demands, such as choice of rural setting or providing enhanced benefit packages (Hagopian et al. 2009; Mullei et al. 2010).

This study has several limitations. Participating medical schools were limited to those located in the Kathmandu Valley; Nepal has a highly diverse geography, and students in

| Table 6 Bivariate analysis of attitude statements associated with preferring abroad and preferring rural areas |
|---------------------------------------------------------------|
| Factors’ association with the intention to practice abroad | Factors’ association with the intention to practice in a rural setting |
| Odds ratio | 95% confidence interval | n | Odds ratio | 95% confidence interval | n |
| There are greater opportunities for a physician to make money in the US. | 1.7 | 0.9–3.2 | 426 | 1.2 | 0.6–2.5 | 432 |
| I need to leave Nepal to get enough training in my field. | 3.3 | 1.5–7.5 | 423 | 0.8 | 0.4–1.4 | 429 |
| Nepal’s government is likely to be unstable in the future. | 2.1 | 1.2–3.7 | 426 | 0.6 | 0.4–1.1 | 432 |
| I can make a good salary practicing medicine in Nepal. | 0.5 | 0.3–0.9 | 426 | 1.1 | 0.7–2.2 | 432 |
| The political situation in Nepal in the last 15 years has made leaving the country more necessary. | 2.5 | 1.4–4.6 | 426 | 0.6 | 0.3–1.1 | 432 |
| Moving abroad has been a desire of mine since childhood. | 6.1 | 3.5–10.5 | 427 | 0.6 | 0.3–1.4 | 433 |
| I have a duty to the people of Nepal to practice in Nepal. | 0.4 | 0.2–0.6 | 426 | 3.6 | 1.1–12.1 | 433 |
| There are enough postgraduate positions for everyone who wants one. | 0.9 | 0.5–1.6 | 427 | 1.1 | 0.7–2.1 | 433 |
| I would feel isolated if I went to a rural area to practice. | 1.5 | 0.9–2.6 | 423 | 0.4 | 0.2–0.8 | 430 |
| I would feel isolated if I went abroad to practice. | 0.6 | 0.2–1.1 | 425 | 1.4 | 0.5–2.6 | 431 |
| A period of service in a rural area should be made mandatory for all Nepali physicians. | 0.7 | 0.4–1.1 | 420 | 2.2 | 1.1–4.2 | 427 |
| Additional payments from the government would make me more likely to practice in a rural area. | 1.0 | 0.6–1.8 | 424 | 1.2 | 0.6–2.1 | 430 |

Note: Odds ratios greater than 1 indicate an increased likelihood of association between agreement with a statement and practicing abroad (compared with practicing in Nepal) or practicing in a rural setting (compared with an urban setting). Values in bold are statistically significant (P < 0.05).

Source: Survey of 469 students in their final year or two of four medical schools in the Kathmandu Valley in Nepal.
other regions may have differing attitudes and intentions. However, respondents came from 52 of Nepal’s 75 districts, and 45% of the total Nepali respondents were born in districts outside the Central administrative region, which contains the Kathmandu Valley. Secondly, a major limitation of this study was that it measured medical student intentions rather than their demonstrated actions. This type of survey research is particularly subject to social desirability bias, in which students may feel that one particular response is expected and answer accordingly. For instance, 94% of those students who were at least thinking about going abroad said they will return to Nepal. No official statistics are available, but it is thought in the Nepali medical community that very few physicians return to Nepal from Western countries. All four of these schools have community medicine curricula, and in the free response section of the survey, many students noted that Nepal’s significant

Table 7 Comparison of Ministry of Education (MOE) scholars with their private school counterparts

| Factor                              | Odds ratio | 95% confidence interval | n  |
|-------------------------------------|------------|-------------------------|----|
| Male                                | 2.5        | 1.2–5.1                 | 392|
| Government secondary school         | 0.8        | 0.1–6.5                 | 392|
| Village birth                       | 1.4        | 0.7–2.9                 | 383|
| Family income (US dollars)          |            |                         |    |
| <$2600                              | 1          | –                       | 109|
| >$2600 and <$6600                   | 0.4        | 0.2–0.9                 | 165|
| >$6600                              | 0.6        | 0.2–1.4                 | 83 |
| Qualifying exam performance         |            |                         |    |
| Average                             | 1          | –                       | 176|
| Above average                       | 0.8        | 0.3–2.0                 | 148|
| Excellent                           | 6.3        | 2.9–12.5                | 63 |
| Medical school performance          |            |                         |    |
| Average                             | 1          | –                       | 176|
| Above average                       | 1.7        | 0.8–3.6                 | 148|
| Excellent                           | 6.7        | 2.0–22.4                | 13 |
| Final year of medical school        | 1.1        | 0.6–2.1                 | 393|
| Relative who is physician           | 0.5        | 0.2–0.9                 | 390|
| Relative who is in the West         | 0.3        | 0.2–0.6                 | 389|

Note: Odds ratios greater than 1 indicate that the factor is associated with an increase in the odds of being a MOE scholarship recipient vs paying for private medical school. Values in bold are statistically significant (P < 0.05).

Source: Survey of 469 students in their final year or two of four medical schools in the Kathmandu Valley in Nepal.

Table 8 Multivariate analysis of demographic factors that are associated with intention to practice rurally

| Factor                              | Adjusted odds ratio | 95% confidence interval |
|-------------------------------------|---------------------|-------------------------|
| MOE scholarship                     | 5.0                 | 1.7–14.0                |
| Male                                | 1.0                 | 0.5–2.0                 |
| Self-paying private medical school students (vs MOE and IOM students) | 1.3 | 0.5–3.4 |
| Government secondary school         | 5.2                 | 1.7–15.5                |
| Village birth                       | 2.6                 | 1.2–4.9                 |
| Family income (US dollars)          |                     |                         |
| <$2600                              | 1                   | –                       |
| >$2600 and <$6600                   | 0.7                 | 0.4–1.4                 |
| >$6600                              | 0.6                 | 0.2–1.4                 |
| Relative who is physician           | 0.9                 | 0.3–1.8                 |
| Relative who is in the West         | 0.5                 | 0.3–1.0*                |

Note: The model was constructed using all significant variables from Table 5. There were 392 observations in the model. No variables were dropped for co-linearity. Values in bold are statistically significant (P < 0.05).

MOE = Ministry of Education; IOM = Institute of Medicine.

*P = 0.067.

Source: Survey of 469 students in their final year or two of four medical schools in the Kathmandu Valley in Nepal.
health needs obligate them to return. Thus, social desirability bias may explain the discrepancy that nearly half the students said it was likely or very likely they would practice in rural areas, yet very few physicians are currently practicing in these areas. In addition, differences in the specific content of the four schools’ aforementioned community medicine curricula could be another source of confounding by influencing students’ stated preferences.

Finally, there may be methodological limitations to using this type of survey design with students from Nepal. Informally, many students reported that predicting their future practice locations or preferences is difficult because of the rapidly changing medical education climate in Nepal. Newly graduated Nepali physicians have far less choice about their specialty or practice location than do graduates in more developed countries, because the limited number of residency positions in Nepal severely curtails the ability to declare a preferred specialty. In addition, these students were in the final 2 years of the medical school curriculum, yet they still had another fifth year of ‘internship’ to complete before searching for work. A previous study of 24 Nepali medical students reported the general absence of career advising in the private medical schools (Marahatta and Dixit 2008), and uncertainty over ultimate practice location may have limited the validity of these responses.

Conclusions
As Nepali medical education evolves, the study data suggest several areas of potential policy changes. We advise policy makers to look closely at which types of students receive subsidized education. Merit-based subsidies select for the academically strongest students, who also are probably those most likely to take their subsidized skill sets abroad. As suggested by this study’s data and as recommended by a recent World Health Organization report (WHO 2010), there is evidence that directing scholarships at qualified students with rural backgrounds would increase the number of students who state an intention to practice in rural areas. This programme could be combined with programmes for qualified students from government schools since these students are also more likely to practice in rural areas, and are currently under-represented at only 5% of the medical school population. Encouragingly, a majority of students agreed with a policy obligating all newly graduated Nepali physicians to serve some time in rural areas; this system could be expanded to meet the short-term rural needs while long-term recruitment policies are implemented.

To limit the need for new graduates to go abroad for specialty training, Nepal could expand its number of postgraduate positions. Currently, only about 380 postgraduate spots are offered at Nepali institutions for about 1000 graduating physicians (statistics from Nepal Medical Council, 2009). Expressing a need to leave Nepal to get sufficient medical training was associated with intent to go abroad for practice. All students surveyed expected to complete postgraduate training, but clearly not every newly graduated physician is able to complete training in Nepal. Additional new postgraduate spots should be weighted toward the types of continued training that would be useful in rural Nepal, e.g. medical doctorate in general practice, general surgery, women’s health and community medicine.

With limited governmental resources, the rapid expansion of Nepali medical schools would have been difficult to achieve through purely public means; even the MOE scholarship is ultimately funded by private institutions. It could be argued that if students (and their families) are willing to pay upwards of US$31 000 for the chance at a medical career, this should be allowed. But it is an open question as to whether a policy that will create a large influx of new physicians into urban Nepal without postgraduate training—as predicted by our data—will lead to an oversupply in the cities but leave patients in rural and remote areas still underserved. Nepali policy makers need better methods for tracking the practice location of newly graduated physicians so that the medical education system can most effectively match the health needs of the country.

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Conflict of interest
None declared.

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