*Pharmacy Education*, December 2007; 7(4): 359–373

# Choosing a course of study and career in pharmacy—student attitudes and intentions across three years at a New Zealand School of Pharmacy

STUART CAPSTICK, JAMES A. GREEN†, & ROSEMARY BERESFORD

*School of Pharmacy, University of Otago, Dunedin, New Zealand*

**Abstract**
Factors influencing undergraduates' selection of Pharmacy as a course of study, career, study and professional perspectives were evaluated by survey over the years 2004–2006 at Otago University, New Zealand. Altruistic intent emerged as a powerful motivator for choosing pharmacy and entrepreneurial career intentions were prominent. A sizeable though declining number of students selected pharmacy secondarily to medicine or dentistry. Gender differences were found between intended areas of practice.

**Keywords:** *Choosing pharmacy, career choice, survey, undergraduate*

## Introduction

Graduates from the National School of Pharmacy (NSP) at Otago University represent just over half of all Pharmacy graduates educated in New Zealand. In the year 2006, these students constituted 45% of additions to the practising register, with other significant additions being from Auckland University (23%) and UK/Ireland (21%; Pharmacy Council of New Zealand, 2005a). The motivations, career aspirations and choices of NSP students will therefore have a significant influence on the future practice and culture of Pharmacy both in New Zealand and on the work overseas that many will pursue. Indirectly, selection criteria used to admit students to the BPharm course will also play a role in shaping the next generation of pharmacists.

### *Choosing pharmacy as a course of study—demographics and motivations*

The choice by students of any undergraduate degree involves many factors, including but not limited to: socioeconomic variables, gender and ethnicity, academic ability and academic self-concept, career ambitions, personality, and prior educational attainment (Van de Werfhorst, Sullivan, & Cheung, 2003; Reay, Davies, David, & Ball, 2001; Pike, 2006; Porter & Umbach, 2006; Abowitz, 2006). Recent studies in the UK have indicated that there are increasing numbers of women studying pharmacy, with almost twice as many women as men qualifying as pharmacists in 2005 (Hassell & Eden, 2006) leading to pharmacy now being described as a "female-dominated" profession (Hassell, 2003). The ethnic mix of pharmacists in the UK is also becoming more diverse, with around 25% of newly qualified pharmacists now recorded as being "Asian British" (Hassell & Eden, 2006)—that is to say Indian, Pakistani or Bangladeshi—compared with 4% of the population (Census, 1991/2001). Black British and Chinese ethnic groups are also growing in representation (Hassell & Eden, 2006), though there is huge variability in the make-up of course cohorts around the country (Willis, Shann, & Hassell, 2006d).

Race or ethnicity has in a different way been shown to be strongly associated with the pursuit of a pharmacy degree and career. A US investigation into

Correspondence: R. Beresford, School of Pharmacy, University of Otago, Dunedin, New Zealand. Tel: 64 34797273. Fax: 64 34797034. E-mail: rosemary.beresford@stonebow.otago.ac.nz
†Tel: 64 34797325. Fax: 64 34797034. E-mail: james.green@stonebow.otago.ac.nz

ISSN 1560-2214 print/ISSN 1477-2701 online 
DOI: 10.1080/15602210701673811

whether individuals who had initially expressed an interest in pharmacy subsequently pursued this field, found that Hispanic or "other" ethnic group students were 12 times more likely than White students to continue with their plans to become pharmacists (Cline, Mott, & Schommer, 1999). This study found that those with higher grade point averages and career commitments were also more likely to apply to study pharmacy, suggesting that "despite pharmacy's uncertain future, it is still able to attract academically qualified students" (P399). The role of ethnicity, attitudinal traits and academic factors have been found to interplay in other ways, for example with family influence in choice of pharmacy as a career reported to be particularly strong for non-White students (Willis, Shann, & Hassell, 2006a).

The strongest motivating factor to study pharmacy in the UK has recently been found to relate to its being a science-based course, with other extrinsic and intrinsic motivators also featuring—namely career status and prospects, and a desire to help people and to work with patients (Willis et al., 2006d). In Australia, extrinsic factors relating to self-employment and salary, and intrinsic factors relating to a liking for science, interpersonal aspects and a desire to be socially useful have all been found to influence students' choice of pharmacy as a degree (Roller, 2004). At the graduate entry level, future employment prospects and a desire to make a contribution to healthcare feature most highly as factors influencing decision to study pharmacy (Davey, Evans, & Stupans, 2006). Consistency in motivations to study pharmacy across time and cultures is indicated when it is considered that similar findings relating to science, salaries and a "desire to help humanity" were obtained in the US from the 1950s through to the 1970s (Cline et al., 1999; Pratt, 1956; Smith, Gibson, & Mikeal, 1974).

Around 75% of UK pharmacy students initially chose pharmacy as their first course of study, with white females most likely to take pharmacy as a first choice (84%; Willis et al., 2006a). Ethnicity also emerged as a factor in first degree selection, with almost four times as many non-White students reporting pharmacy was *not* their first choice of degree, compared with White students. At the NSP, it is said to be "inevitable" that a portion of undergraduates will not have opted first for pharmacy, as the majority of students take a common health sciences first year and subsequently compete for entry to pharmacy, medicine, dentistry and physiotherapy courses, for all of which they may apply at the end of this year (Shaw, 2000).

### *Selection criteria*

Admission to pharmacy at NSP is mostly based on students obtaining a minimum of an average B grade (70%) in the common health sciences first year. A smaller number of students are admitted from second or subsequent year of study, usually at Otago, or as "competitive" graduates (of a New Zealand university within the previous 3 years). An "alternative applicant" category brings in a few others: those who may have graduated from a New Zealand university more than 3 years previously; those who have obtained degrees, usually in medicine or pharmacy, from an overseas university; and those who have worked as an allied health professional (most often a pharmacy technician or nurse) for 5 years or more. All such applicants are required to have passed the subjects of Otago's common health sciences first year course (or the equivalents) and to have demonstrated competence in English. A certain degree of positive discrimination exists in that students who are Maori or Pacific Islanders may be brought into the BPharm programme even if they achieve only an average of 65% or more during their pre-admission year(s). Only about 1–2 students are admitted in this way each year, however. Very few applicants for admission are interviewed—only those applying as "alternative" candidates and for whom English is not their first language.

In the UK, A-level grades have been found to show a small but significant correlation with grades at pharmacy undergraduate level and thus it has been argued that both teachers' estimates of A-level performance and actual A-level scores remain useful in selection and forecasting (Foy & Waller, 1987). A-level biology scores may perhaps be a stronger predictor of performance in a pharmacy degree, and English ability at entry level is also important as an indicator of student success (Sharif, Gifford, Morris, & Barber, 2003). Given that pharmacy undergraduates must have the capacity to acquire diverse scientific knowledge and skills, as well as developing the knowledge and interpersonal skills of pharmaceutical care, it is also reasonable to ask whether there might be other selection criteria also applicable to undergraduate admissions. With respect to the contemporary focus of pharmacy practice as one centred on patient care (Strand, Cipolle, Morley, & Frakes, 2004), it has been suggested that formal assessments of self-reported empathy be used in the admissions processes of pharmacy schools. Similarly, with reference to the scientific demands of the course, that critical thinking skills and mathematical ability should be taken into account, in addition to a range of other non-academic and affective qualities (Duncan-Hewitt, 1996).

The use of a variety of aptitude tests for pharmacy admissions is now commonplace in the US (Chesnut & Phillips, 2000), for example the Pharmacy College Admission Test (PCAT; Duncan-Hewitt, 1996; Chesnut & Phillips, 2000), which incorporates measures of communication skills, reasoning ability and chemistry- and biology-specific knowledge (American Association of Colleges of Pharmacy, 2006).

Currently, no equivalent pharmacy admissions test exists at the NSP; however, students pursuing entry into medicine or dentistry from the common health sciences first year *are* admitted in part according to their performance on the UMAT (Undergraduate Medicine and Health Sciences Admissions Test). Given the potential relevance of various factors which may be used in admissions, ranging from interpersonal relations to problem-solving skills to ethical awareness (Chesnut & Phillips, 2000), the novel step was taken in this study to ask students themselves, what they consider to be important and relevant selection criteria for the pharmacy degree.

### *Career aspirations—professional intentions and influences*

In the US, a study of eight Pharmacy Schools indicated that the majority of students (71%) have career aspirations that are strongly oriented towards "direct patient care", although concern is expressed that this may be at odds with the realities of drug distribution-based pharmacy likely to be encountered in the professional workplace (Siracuse, Schondelmeyer, Hadsall, & Schommer, 2004). This study also found evidence that the more career-committed of students will also be those aspiring to work in direct patient care. Others have found that the "professional subculture" of students entering pharmacy is comparable to nursing and medical students as regards their emphasis on patient care (Horsburgh, Perkins, Coyle, & Degeling, 2006).

Pharmacy students in the UK apparently possess a strong expectation that they will work very hard no matter what pharmacy job they acquire—95% believe this to be the case—and 80% state they are very ambitious about their pharmacy career (Willis et al., 2006a). Diverse factors have been shown to affect the choice made by students about specific career paths, including previous work experience, the influence of sections of the undergraduate syllabus directed towards pharmacy practice (Siverthorne, Price, Hanning, Scanlan, & Cantrill, 2003) and practical matters such as salary and work location, a desire for personal fulfilment and to help patients (Carvajal & Hardigan, 1999; Carter & Segal, 1989).

As recently as 2000, concern has been expressed that hospital pharmacy in the UK is said at the undergraduate level to have an "image problem", being considered elitist, badly paid, dull and repetitive (Hatfield, Marriott, & Harper, 2000). In contrast to this (or perhaps evidence of a shift in attitude and intention of students), more UK students stated that they were at least "certain" that "in 10 years time" they wanted a career in hospital pharmacy (60%) compared to any other career option, although significant interest was shown in community practice (proprietor, 33%; employed by multiple, 51%), working abroad (43%) and primary care (37%; Willis et al., 2006a). Given that more than one option was permitted in this survey, students do appear to be hedging their bets to an extent, but these figures at least suggest an open-mindedness about the practice sites available to them.

Of those intending to work in the community sector in the UK, strong entrepreneurial intentions are evident, with 44% of male students and 28% of female students saying they are certain they want to own a pharmacy (Willis et al., 2006a) and pharmacy ownership reported as the top ambition for students (Wilson, Jesson, Langley, Hatfield, & Clarke, 2006). The proportion of these individuals who will attain their ambitions, given the decline of the independent pharmacy in Britain, remains to be seen, however. Consequences of the "feminisation" of pharmacy relate to the likelihood of women working part time once in their 30s, and gravitating towards temporary community work (Hassell, 2003). It has been suggested also that this feminising shift may at least correlate with pharmacy itself becoming a more attractive career for women than men (Gidman & Hassell, 2005).

Attitudes and career intentions in pharmacy have not been as clearly elucidated in New Zealand. However, given that currently 2100 (82%) of pharmacists work in the community sector and 300 pharmacists (10%) in the hospital sector (Pharmacy Council of New Zealand, 2005b) it could be valuable to assess students' perceptions of these and other career paths.

### *Aims of this study*

This study evaluated factors influencing students' decisions to study pharmacy and to work as health professionals, as well as the characteristics they consider important for selection to the course and for practising pharmacy. Also investigated were pharmacy students' career aspirations and intentions, and the relative importance and attraction of various professional activities and incentives. NSP students across three separate cohorts and years were surveyed to examine for commonalities and trends in these areas.

## Method

This study, approved by the University of Otago Human Ethics Committee, was developed in December/January 2002/2003 following a series of interviews and focus group discussions with current and recently graduated students. It was piloted in 2003 by a group of student researchers on that year's second year intake, following which a number of minor adjustments were made to ensure consistency and ease of analysis. The questionnaire has since then been administered routinely to each incoming second year class at the start of their first lecture, in the School of Pharmacy. This first lecture which introduces students

to the School and pharmacy profession, is attended by most students, all of whom have just been admitted into the BPharm programme. The results presented in this paper relate to the second year students of 2004–2006.

The (anonymous) questionnaires were distributed around the lecture theatre before the start of the lecture. Students were then given 15 min to complete the surveys and were asked to do so in silence, without reference to their neighbours. At the end of the allotted time, class representatives collected the completed questionnaires and handed them to the academic staff member present (who was not one of the researchers).

The questionnaire consisted of 24 separate questions, many of which were subdivided into further categories of choice. Most questions were multiple-choice, requiring respondents to rate statements on a Likert-type scale of 1–5, with 1 being not at all important/ not at all interested through to 5 as most important/ very interested. Other questions asked students to rate order of importance of factors (e.g. order of priority of factors influencing decision to study pharmacy) or to make selections from alternatives (e.g. ethnicity).

The following areas from the survey questionnaire were analysed for the period 2004–2006:

1. Why do you want to work as a health professional? (rating scale 1–5, 17 statements)
2. Which three of these factors (statements from Question 1) were the *most* important in your decision? (Please list in order of priority)
3. What, in your opinion, are the most important attributes that the *School of Pharmacy* should consider when selecting people for the Bachelor of Pharmacy programme? (rating scale 1–5, 12 statements)
4. When you applied for admission to the Health Sciences, was Pharmacy your first preference? (yes/no) If not, please state which programmes were preferred.
5. At this stage in your BPharm programme, do you *want* to become a pharmacist? (yes/no)
6. Community pharmacists are involved in many of the following activities in their day to day work. Which activities are of most interest to you? (rating scale 1–5, 11 statements)
7. What aspects of being a pharmacist are most important to you? (rating scale 1–5, 14 statements)
8. During my working life, I would like… (tick as many phrases as you feel apply [12 statements])
9. If you had to choose a pharmacy career path *today*, in what field would it be? (Please tick one [6 options])

Further questions were also asked about gender, age, ethnicity, language spoken and residency status.

Data were collated and analysed for all student responses over the 3 years ($n = 351$) and separately for each year to examine for trends. Participants' responses between questions were not linked for the 2005 data, so analyses linking responses from different questions are only presented for 2004 and 2006.

In addition to reporting descriptive statistics, participants were forced to rank only three factors in Question 2. Thus ranking data in Figure 1 represent the mean number of times participants ranked a factor as primary importance (3), secondary importance (2), and tertiary importance (1). A score of 3 would indicate all participants said a factor was the most important; conversely a score of 0 indicates a factor was not ranked in the top 3 by any participant.

Using the two smallest cohorts (2004 and 2006), it was estimated using *G**Power 3 that with 80% power, a two-tailed pairwise comparison would be able to detect an effect of $d = 0.38$. By convention, values of 0.2 and 0.5 are considered to be small and medium respectively, meaning that where differences were not found, any real differences are likely to be close to small in size.

## Results

A total of 351 students completed the survey (2004, $n = 103$; 2005 $n = 125$; 2006, $n = 123$) representing 98% of the total of three cohorts. All students in 2005 and 2006 completed the survey; 103 of 110 students did so in 2004. There was a small level of non-response on some questions, but this appears to be a student accidentally omitting a question rather than systematically not responding.

### *Motivations to study pharmacy*

The left-hand panel of Figure 1 shows a strong degree of consistency between years as to the primary ranked motivations of students to work as a health professional (Question 2). By far, the most highly ranked motivation was a desire to work in a job where they "care for/ help people", which was twice as highly ranked as the next highest motivation, an "interest in human biology". A job involving interaction with people, a high salary, a desire to work in the community, a desire to own a business and a number of other aspects also featured as important motivators. University publicity, friends studying in the health sciences, family tradition and "having high grades but not knowing what else to do" were the least reported reasons for wanting to work as a health professional.

The right-hand panel of Figure 1 presents mean rating data for the same factors. Few trends across the surveyed years were evident in students' motivations to work as a health professional, with the exception of a desire for a "career in research". Over the 3 years, there was an approximately 15% increase in the importance placed on this factor. It would seem therefore that students coming into the pharmacy course are increasingly explicitly considering a research

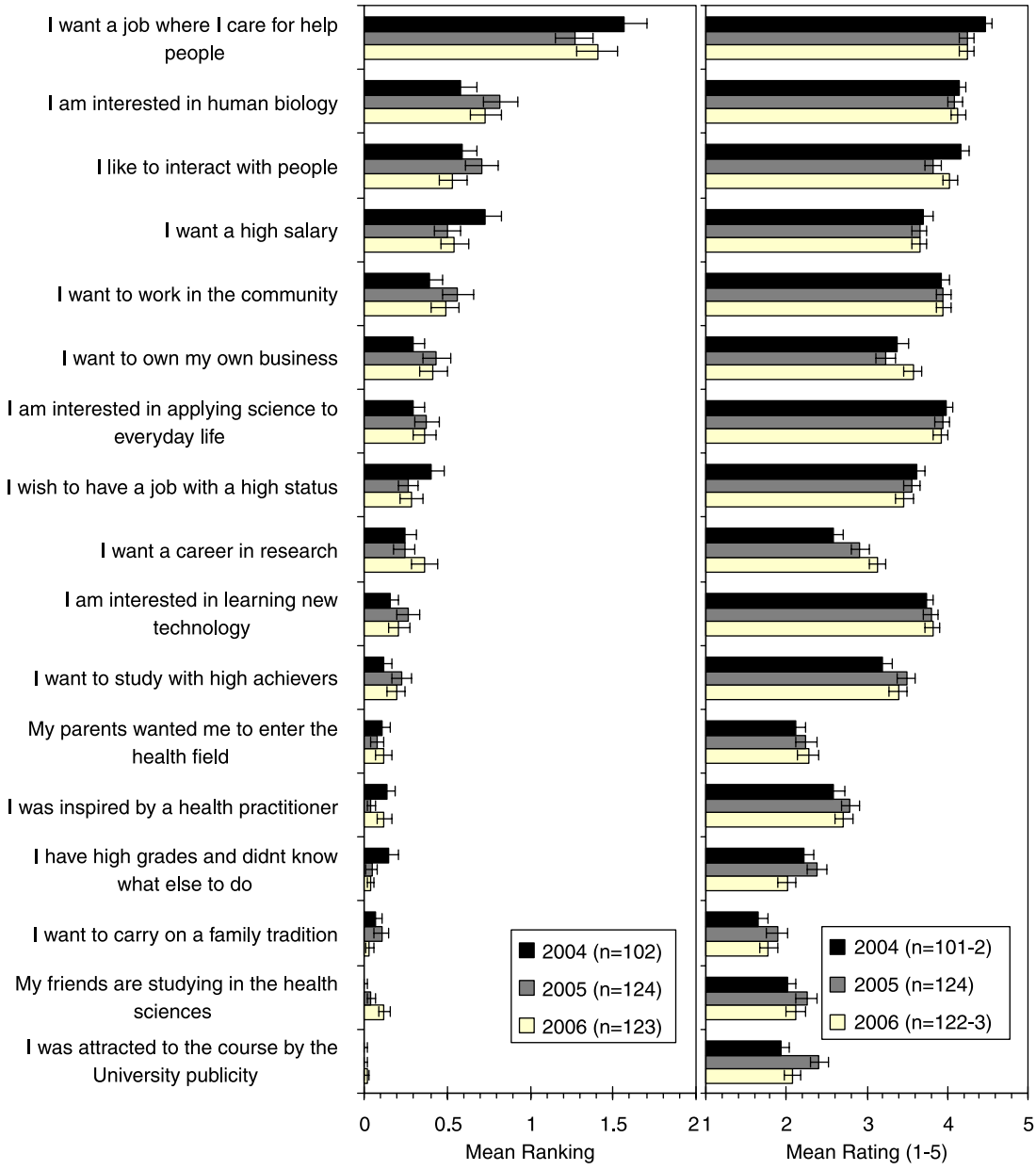


Figure 1. Mean ranking (left panel) and rating (right panel) with standard error of factors exerting most influence on choice of pharmacy. (For ranking scores, a 3 would indicate a factor given top ranking by all participants, 2 a factor ranked on average factor second, 1 a factor ranked third, 0 factor not ranked in top 3 by any participant).

career at an early stage. It is also interesting to note the difference in responses between the ranking and rating data. For example, students were clearly interested in learning new technology, but it was not a top priority.

### *Admissions criteria*

Figure 2 shows that students rated being a good communicator with good English (language skills) as the top attributes that they considered the School should consider when selecting people for the pharmacy programme. High marks in health sciences first year and in science at school were also highly-rated, as was having an "orderly/controlled mind". Those attributes considered least important from the options presented were a previous tertiary qualification, being an older student and high marks in arts subjects at school.

### *Study and career commitment*

A large, but slightly decreasing number of students opted first for medicine or dentistry on application from health sciences, with those opting for pharmacy as their first choice ranging between 38 and 50%. 2006 was the first year of the three that more students selected pharmacy as their first preference than did not (50% (CI: 42–59) in 2006, vs. 38% (CI: 30–47) in 2005 and 46% (CI: 36–56) in 2004). One notable trend is the decreasing numbers of students opting for medicine as their first preference,

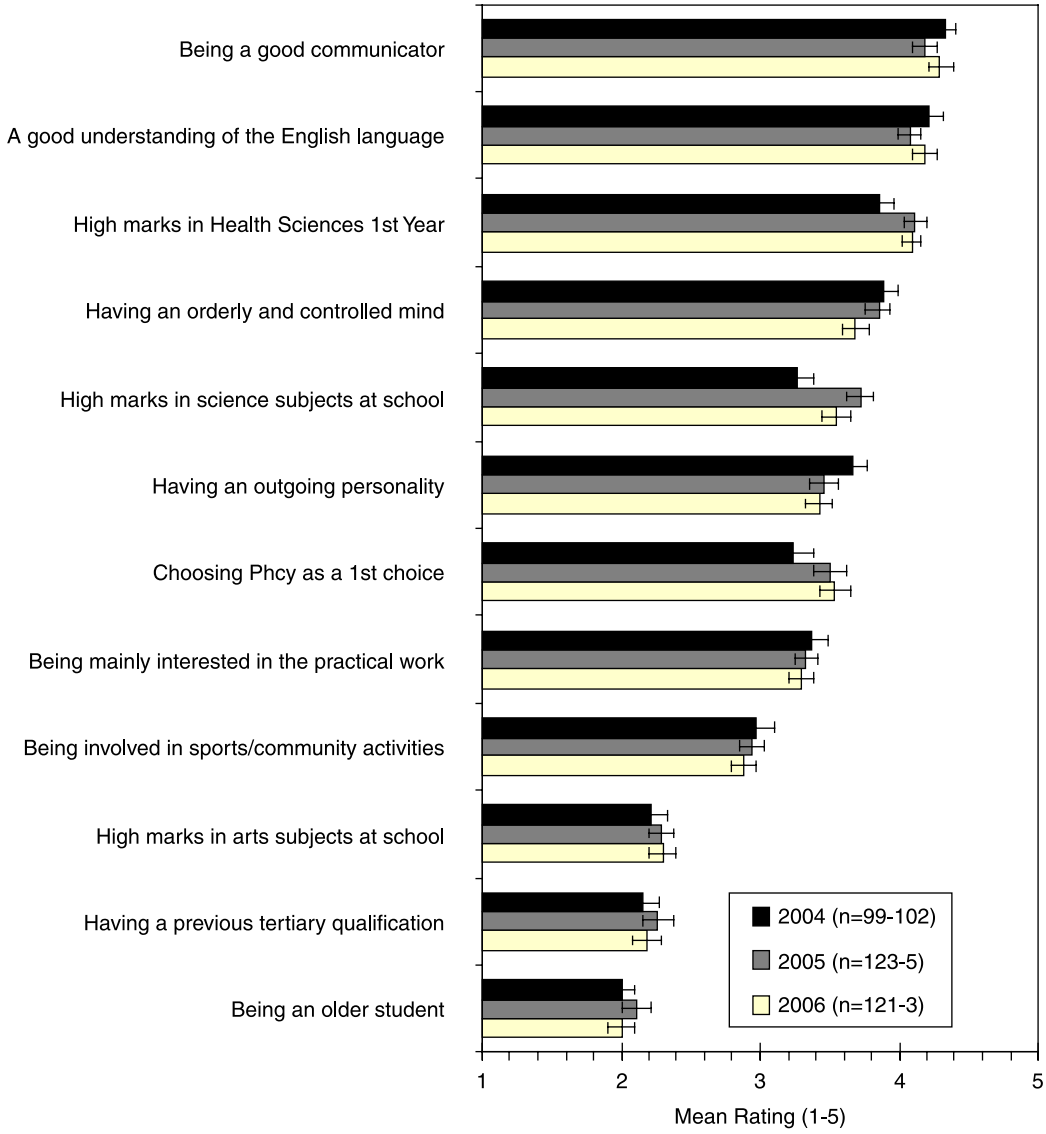


Figure 2. Students' mean rating (with standard error) of what should be the most important selection criteria for the school of pharmacy.

from 38% (CI: 29–48) of applicants in 2004 to 33% (CI: 25–41) in 2005 and 24% (17–32) in 2006.

There appeared to be an increasing conviction among students that they wished to become "a pharmacist". In 2004, 82% (CI: 75–90) of students stated they "*want* to become a pharmacist", in 2005 this rose to 89% (CI: 84–95) and 2006 to 98% (CI: 95–100). Of the 3 students in 2006 who said they did not, one stated they would prefer to go into research.

### *Matters of interest and importance in a pharmacy career*

There appeared to be a sharp division in interest in aspects of the role of the community pharmacist, between the "generic" work of selling products, arranging staff duties and administration, and health care-specific work such as offering health promotion and compounding drugs. Students rated the eight health care-specific activities presented as being of similar interest (each receiving an average rating of around 4 out of 5) and the three generic items at around 3 out of 5 (Figure 3). Out of the eleven activities presented for rating, students rated "listening to patients" and "interviewing people" most highly, suggesting a particular enthusiasm for the interpersonal aspects of pharmacy work.

"Reliable employment" and "steady job" were the highest-rated aspects of being a pharmacist followed closely by "ability to travel" (Figure 4). A number of other factors were also rated, including professional status, a good salary and working in the health sciences and in the community. The least-rated aspect is "working in a retail shop".

Looking at trends evident in Figure 4, there was a slight decrease in importance placed on the "ability to travel with my qualification" as an important aspect of being a pharmacist over the years (though it is still

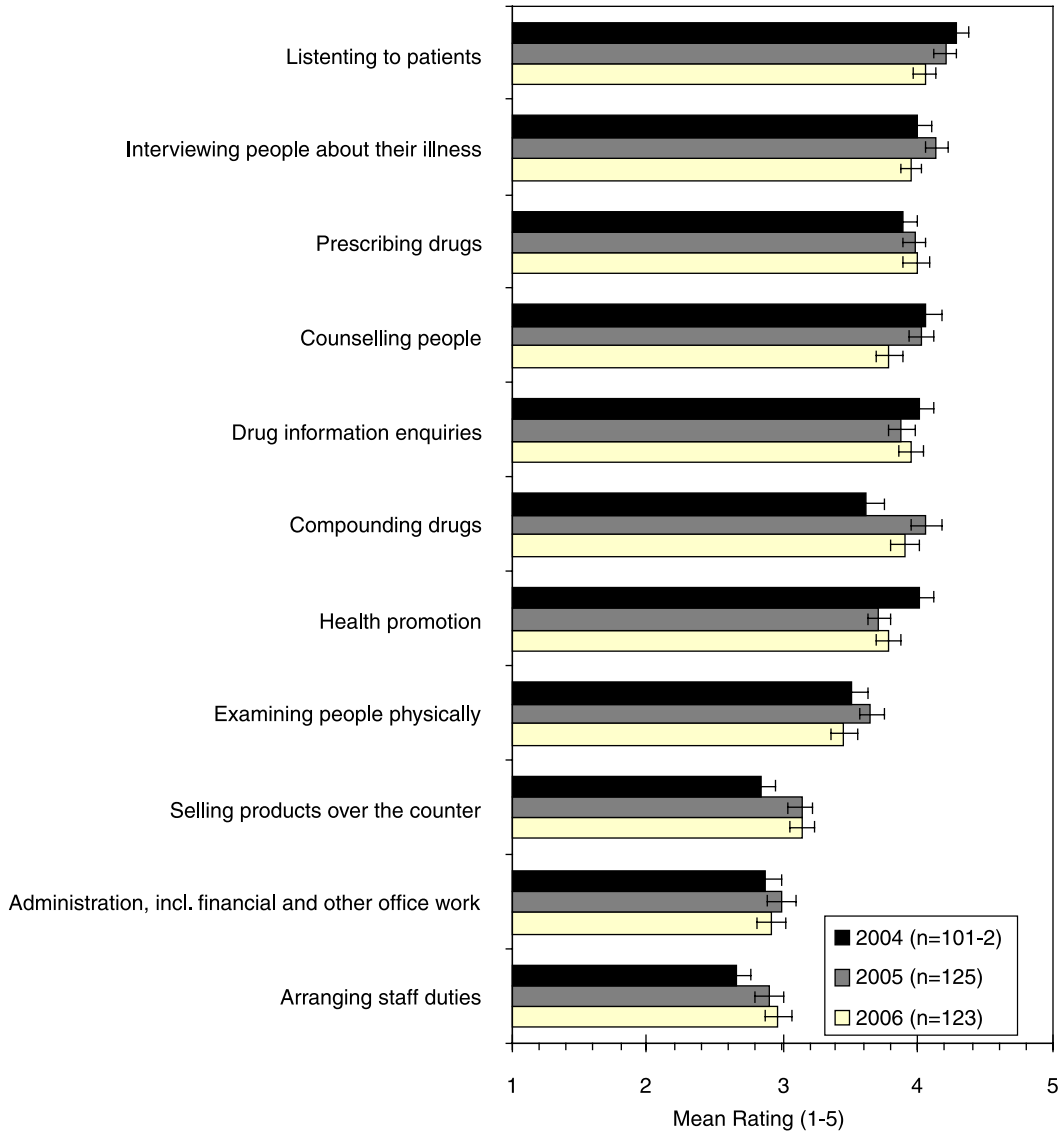


Figure 3. Mean rating (with standard error) of interest in aspects of pharmacy practice.

rated highly), a similar decline in the importance placed on salary, and a corresponding increase shown in the importance of "owning my own pharmacy".

*Career aspirations*

Looking to the future, an overwhelming majority of students (87% averaged over 2004–2006) stated that, during their working life they would like to be able to live and work outside New Zealand (Figure 5). There is some evidence of this declining in later years. A high proportion of students (62%) would like to find work in New Zealand, however, and only 11% say they want to move away from New Zealand permanently.

Over two-thirds of students, stated they would like to own a business at some point during their working life. Furthermore, when asked separately to indicate what pharmacy career path they would choose "if they had to today" the majority chose "owner, community pharmacy (urban)". This choice has remained relatively constant over the years (Figure 6). There has been a decline in the number of students stating they would choose a career in hospital pharmacy. Only small numbers of students each year (around 4%) indicated they would choose a career as a lecturer or in public administration.

*Undergraduate demographics*

New Zealanders of European descent made up the largest proportion of students at NSP at 39% with sizeable other groups being ethnic Chinese (19%), Korean (9%), Taiwanese (7%), Malay (6%), (Fijian) Indian (6%) and Middle-Eastern (5%), though it is worth noting that there are 25 separate ethnic groups/nationalities listed in responses.

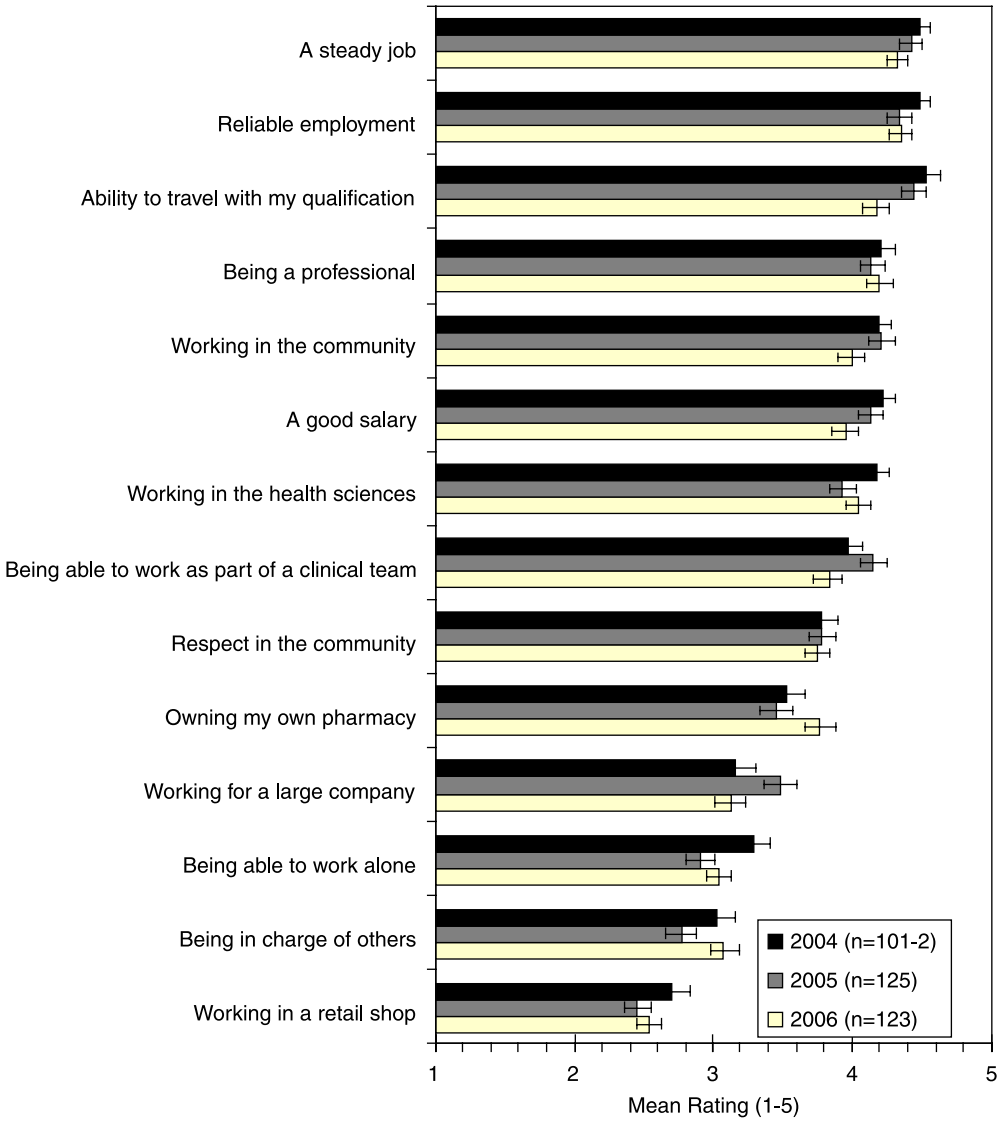


Figure 4. Students' mean (with standard error) rating of interest in aspects of importance in a pharmacy career.

The male to female ratio of students studying pharmacy has been consistent since the mid 1970s, at about two-thirds female to one-third male students (64–36%). This contrasts with the university student profile as a whole, which is 55% female and 45% male. The majority of students beginning the course are 18 or 19 years old (around 80%), with around 15% aged 20–22, and less than 5% aged 23 or over.

### *Gender and ethnic differences*

Gender differences were found to exist in the career aspirations of students (Figure 7). Only 2004 and 2006 data were able to be analysed for effects, and across both years female students were more likely than males to indicate that they would choose hospital pharmacy "if you had to choose a pharmacy career path *today*" (females 37% versus males 20%; $p = 0.006$). There were no significant differences between male and female students in their preferences for an urban pharmacy or rural pharmacy career. However, male students were twice as likely as female students to opt for research as a career path (females 13% versus males 31%, $p < 0.001$). When asked whether during their working life students wanted to own a business, 89% of male students indicated this as a career ambition, with 81% of females saying they did, though this difference was not significant.

Students' ethnicity appeared to be one determinant of whether they studied pharmacy as a first choice, with New Zealand/European students far more likely to have done so than students from other ethnic groups (63% NZ European versus 37% all "others"; $p < 0.001$). It was not possible to separate out different ethnicities in a fully satisfactory manner because of issues with data collection (changing census classifications) over the years of study. Of those students who identified themselves as "Chinese" ($n = 38$) or "other" Asian

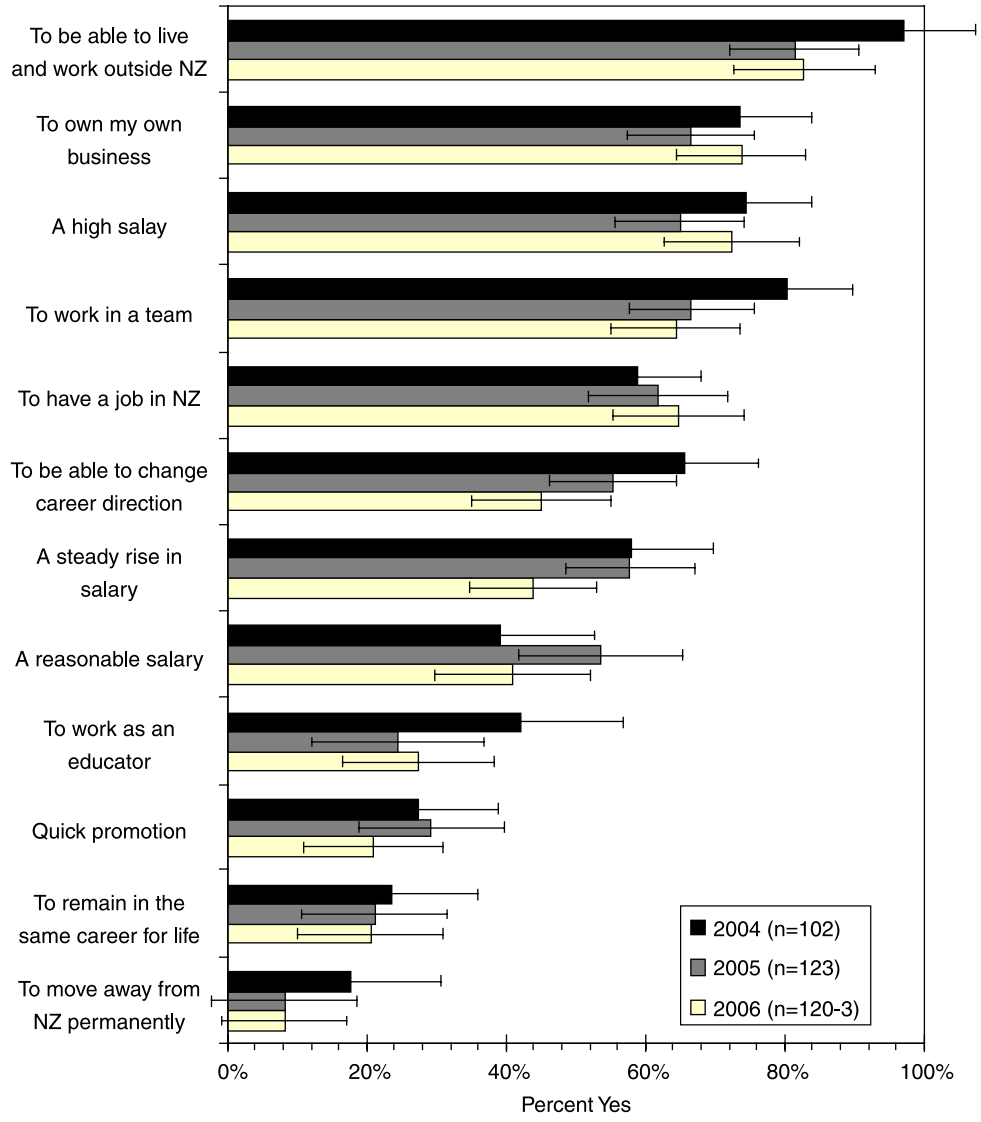


Figure 5. Percentage of students (with standard error) responding Yes to different lifetime career intentions.

($n = 42$), however, less than half had selected pharmacy as a first choice ($n = 27$) and one of the eleven Taiwanese students (all of whom are Chinese by ethnicity if not by politics) had done so. Differences by ethnicity were found in terms of influences of parents. None of the 2006 New Zealand European students rated parental influence most highly in their decision to become a health professional, indeed 70% gave it the lowest possible rating. Parental influence on non-European New Zealanders was more evenly spread with 18% of students rating it as the most important factor in their decision-making and only 33% rating it as being least important.

## Discussion

### *Motivations to study pharmacy*

We have examined the motivation to study pharmacy in a novel way, by asking students to rank which three (of seventeen) factors had most influence upon their choice, in addition to asking students to rate separately the importance of the range of factors. This enables a differentiation between factors that might appear at first sight similarly salient (ratings), and those that were most important in actually influencing a decision (factors scored by rank). Using this method, the most important motivation given by students in this study for choosing pharmacy emerges as an intrinsic, altruistic one: that of a desire to "care for/ help people".

These findings are probably more pronounced than those from other research in this area but do correspond with other studies of pharmacy students' study choices. These studies have consistently reported high prominence of motivations to study broadly describable as altruistic, such as "a desire to help humanity" (Pratt, 1956), aspiring to be "socially useful" (Ferguson, Roller, & Wertheimer, 1986), a desire to make a contribution to healthcare (Davey et al., 2006) and "a desire to help people" (Willis et al., 2006a).

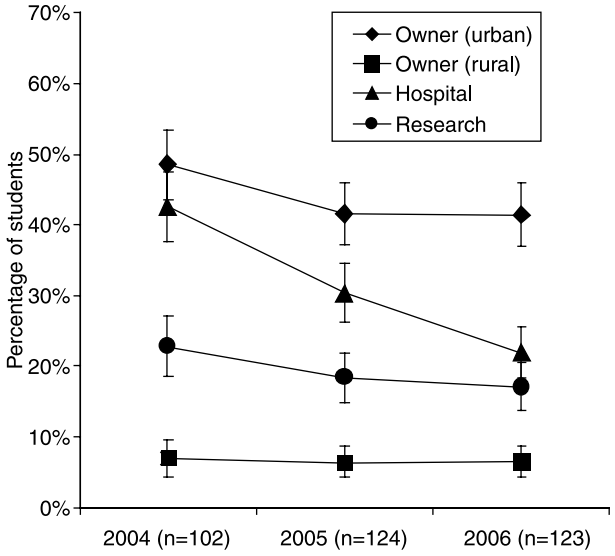


Figure 6. Primary career intentions over time.

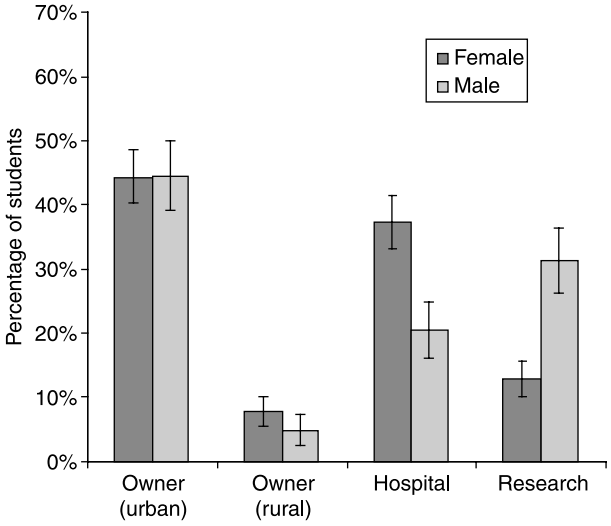


Figure 7. Gender differences in career intentions (2004 and 2006 only, $n = 224$).

These and the current study's results might seem to imply that much of students' motivation to study pharmacy is in large part a deferred one, that is to say directed towards their professional life after graduation; however, other research has indicated that intrinsic factors influencing the selection of a pharmacy degree also relate to the course of study itself. Roller (1993) found that the most important intrinsic or extrinsic influences on Australian pharmacy students were that the course was perceived to be "intellectually satisfying"; however, students' belief that pharmacy was socially useful was also important. Willis et al. (2006d) in the UK similarly identified the science-based nature of pharmacy as the primary draw for students, but again with the desire to help people also strong among intrinsic factors. The current study did not ask directly whether the course of study was inherently appealing, although our finding that the second most important reason why students selected the course was "an interest in human biology" indirectly indicates this is likely to have been relevant.

Extrinsic factors of most importance to students in choosing to study pharmacy relate to a desire to earn a high salary and to own their own business and, to a lesser extent the status of the profession. Previous work has also found that students are motivated to study pharmacy for financial reward and the opportunity for self-employment (Roller, 1993, 2004; Willis et al., 2006d) with the most recent research in this area claiming pharmacy ownership is the "top ambition for students" (Wilson et al., 2006). Seston, Shann, Hassell and Willis (2006) found that just under half of all UK students report the prospect of ownership as having some influence in their decision to study pharmacy, with the effect particularly strong among male students and ethnic minority students. Crucially, they also found a strong link between the prospect of owning a pharmacy as a reason for choosing pharmacy as a degree, and career intentions after three years of study.

### *Career intentions and expected benefits*

In the current study, there appeared to be an early explicit intention expressed by students to pursue a career in pharmacy: 121 of 123 respondents in 2006, stated that they want to become a pharmacist, a proportion that has increased over the three surveyed years. This result is striking for its being obtained at a very early stage in students' course of study, where one might reasonably expect some ambivalence towards the degree (though it should be noted that students were not given the option of expressing uncertainty). These high rates of commitment to a career as a pharmacist may relate to other findings which indicate pharmacy students are career-committed (Willis et al., 2006a) and the finding in this study, that in 2006 for the first time more students selected pharmacy than any other health profession as their first choice of study. In 2004 and 2005, as many of those surveyed had wished to study medicine as pharmacy, whereas in 2006 over twice as many students opted for pharmacy as medicine. Despite this, large numbers (almost half) of NSP students would have preferred to follow another profession, usually dentistry or medicine, as has been noted previously (Shaw, 2000). The tendency for European New Zealand students to be more likely than ethnic minority students to have chosen pharmacy as a first choice is in keeping with other studies which have found similar ethnic differences in application priority. This result is curious though for its being apparently robust across courses, countries and

cohorts (Ferguson et al., 1986; Willis et al., 2006a), despite the very different actual mix of ethnicities studying pharmacy between New Zealand, Australia, Canada, the US and the UK. It may be of concern to educators that ethnic minority, foreign-born or overseas students appear to be those most likely to be studying pharmacy as a second (or lower) choice, particularly considering the high, and in many instances increasing, proportion of these students on pharmacy courses.

Since over two-thirds of students indicated that they would like at some point in their working life to own their own pharmacy, New Zealand students' entrepreneurial intentions seem as strong as their UK counterparts (Seston et al., 2006). Interestingly, there was a decline in the proportions selecting hospital pharmacy as a desired career path over the years surveyed.

With so many students wanting to own their own pharmacy, the question should be asked to what extent these ambitions are realisable. In the UK, they may well not come to fruition "given the steady decline of independent pharmacies through competition from multiples over recent years and an economic climate that is not favourable to small pharmacy business" (Seston et al., 2006). The potential for proprietorship is higher in New Zealand, which has a long tradition of individual ownership. Recent changes in legislation, however, have enabled pharmacists to have a share in up to five pharmacies, with the consequence that groups of pharmacists have banded together to form some small chains of pharmacies, run by manager pharmacists rather than owners. It will therefore be important for educators in New Zealand and elsewhere to be aware that students' ambitions for individual ownership may not remain viable.

That hospital pharmacy sector suffers an "image problem" (Hatfield et al., 2000) is also not so much an issue in New Zealand, where anecdotal evidence suggests that pre-registration hospital placements are more sought after than community internships. The tendency for females to be significantly more interested in hospital work than males found in this current study is in keeping with UK findings (Willis et al., 2006b) and findings spanning the US, Canada and Australia (Ferguson et al., 1986). These findings seem likely to be borne out by students' career trajectories in the UK, where three times as many women as men work in hospitals (Hassell, 2003).

This well-documented gender difference may relate to hospital pharmacy offering more flexible hours and institutional benefits (Cockerill & Tanner, 2001), and also be related to gender differences in entrepreneurial ambitions, given the generally lower salaries pertaining in the sector. Other research looking at UK pharmacy students' perceptions of hospital pharmacy suggests that it is perceived by students to offer poor salaries but more opportunities to interact with patients and better career progression (Silverthorne et al., 2003). However, Hassell (2003) identified concerns among some UK pharmacists that a "glass ceiling" exists for female hospital pharmacists, resulting in them being under-represented in senior positions in this field. This is not the situation in New Zealand; however, where, in 2006, almost 70% of the chief pharmacists working in the country's main hospitals were female.

As for student aspirations to pursue a career in research, New Zealand differs from Europe or the US in that it has only a small pharmaceutical research industry and only two Schools of Pharmacy, which may explain the relatively low numbers of NSP students interested in this career pathway. Interest in a research career, though still quite limited, is growing and may increasingly be considered by students to be a viable career option.

In the current study, students perceived from an early stage the associated benefits of a pharmacy career, foremost among these being reliable employment and the ability to travel with their qualification. Aspects such as being a professional, working in the community and earning a good salary also feature as important facets of being a pharmacist. These and other factors—such as undergraduate practice and work experiences (Silverthorne et al., 2003)—are likely to play a part in influencing the particular career trajectories of students. Perhaps contrary to expectations, Carvajal and Hardigan (1999) have also suggested that females are more likely than males to experience job satisfaction from high salary and retail work. This finding did not emerge in the current study but would be worthy of future attention.

The diminishing importance given by students to an ability to travel as pharmacists from 2004 to 2006 may be a consequence of the recent ending of direct reciprocal employment agreements between the UK and New Zealand, which has traditionally been a popular route for New Zealand pharmacists to engage in their "overseas experience". Despite this decline, it should be noted that almost 90% of students still say they would like to be able to live and work outside New Zealand at some point in their lives. This finding may be particular to New Zealand where it is especially common for university graduates to travel and live abroad for a few years, usually within the first 10 years post-registration.

### *Admissions criteria*

When asked to consider what might constitute appropriate admissions criteria for the BPharm programme, students report that "being a good communicator" was more important as a selection criterion than any other of the hypothetical admissions criteria presented to them, more so even than high marks in the health sciences common first year

or school science subjects. Speaking English well was rated highly, and this aligns with research that has found English skills to correlate highly with final pharmacy exam marks for non-native English speakers (Sharif et al., 2003). Science marks and the critical thinking/scientific capacity indicator "having an orderly and controlled mind" also featured highly in students' opinion of appropriate admissions criteria.

These results regarding student appraisal of what might be important admissions criteria taken together are an interesting indicator of students' own perceptions about what constitutes a good pharmacist and a capacity to do well in the degree course: a combination of good communication skills and cognitive ability. It has been argued in the pharmacy education literature that empathic and other non-traditional measures should be used in student selection (Duncan-Hewitt, 1996; Wright & Miederhoff, 1999). At the university where this study was conducted such measures are not currently used in student selection for pharmacy, though they are in medicine and dentistry. Whether to use such measures in pharmacy admissions is likely to arouse continuing controversy, not least because it is now possible for students to be coached in how to perform well in these tests in such a way that may be construed as "faking" their true attitudes.

*Aspects of interest in pharmacy practice*

Interpersonal/empathic aspects again emerged as aspects of being a pharmacist of most interest to students, with "listening to patients" and "interviewing people" receiving the highest ratings. There appears overall to be a pronounced division in opinions of the two facets of professional pharmacy practice: students perceive non-patient-centred aspects of work, such as administration and selling products, to be less attractive than the range of patient-centred work. This may be a sign that students are already conceptualising pharmacy work as comprising two different types of activity—indirect and direct patient care—and that they are inherently more interested in the latter. This result is perhaps not surprising, and matches other research indicating students aspire more to involvement in direct patient care than indirect patient care, with the latter described as being "product-focused" or involved with "drug distribution" (Siracuse et al., 2004). Such attitudes on the part of students would seem to be in keeping with the altruistic, patient-centred motivations expressed for studying pharmacy in the first place.

The current study's results may in a positive way be placed in the context of Davey et al.'s (2006) remark that "as pharmacy practice continues to emphasise patient interface it is encouraging to see that a contribution to health care is of more significance (to students) than the status of the degree". A cautionary note may also be added though, that in light of these findings it will be important to consider in future research the extent to which students' expectations and aspirations are matched by the realities of the workplace, where "for many pharmacists, there is a clear disconnect between what pharmacy leadership says pharmacists should be doing and the reality faced by practising pharmacists on a daily basis" (Siracuse et al., 2004) especially in terms of the administrative and bureaucratic demands of small business management.

*Undergraduate demographics*

The approximate 2:1 ratio of female:male students at the NSP corresponds with what seems now almost to be becoming an education standard for this increasingly female-dominated profession (Hassell, 2003). Whilst registers of practising pharmacists consist at present of 53% females in the UK and New Zealand (Hassell, 2003; Pharmacy Council of New Zealand, 2005b) this seems destined to change. There are implications for workforce supply, as the current UK register shows a far greater degree of part-time hours worked by women in their 30s and 40s than men of the same age group, which in part is due to family building (Willis et al., 2006c). A similar trend towards feminisation has been observed in other health professions, including medicine and dentistry, in the US, the UK and Australasia, where similar consequences have been predicted as a result.

The student body at the NSP is noteworthy in that it is very diverse and unique to this pharmacy school. Whereas, well-represented ethnic minorities in pharmacy in the UK are "Asian British", that is to say British students of Indian, Pakistani and Bangladeshi origin, in New Zealand the ethnic origin of (mostly New Zealand-resident) minority students are mostly represented by Chinese, Taiwanese, Koreans and Malaysians, with those from Arabic and other backgrounds also rising in numbers. Given the high diversity, there is likely to be consequent variability in the learning behaviours of students that educators may increasingly need to take into account (Miranda, Bates, & Duggan, 2002).

*Limitations and suggestions for future research*

A social desirability effect on the self-report measures in this study may be pronounced because the survey asked about explicitly socially desirable factors such as "desire to care for/help people". A strength of this study is the very high response rate (98%) obtained, largely through our distribution of the survey during compulsory course elements. Although the questionnaire used in this study was based in part on surveys used in previous research into pharmacy student choices, its reliability and validity were not separately tested. Indicators of reliability and validity however include the emergence of dual factors from questions pertaining to direct and indirect patient care and the

congruence of certain career- and study-related motivators emerging in separate areas of the survey, for example in the intention and aspiration to own a business. It is the authors' intention to use a follow-up questionnaire in longitudinal research with the cohort surveyed in 2004–2006, which may give further indications of its validity and reliability. A particular point for concern for this and similar studies is the apparently limited extent to which physicians have accurate retrospective recall of the causes of their own behaviour in relation to career choice (Pathman & Agnew, 1993).

Future work might focus on extending knowledge of intrinsic and extrinsic factors in choice of profession by placing the choice of pharmacy as a degree and career against a wider social context. The extent to which socioeconomic factors and family background influence students' decisions might be further considered, for example. Large-scale work has indicated that "professional" class background can have a particular positive effect upon the choice of prestigious degrees such as medicine and law (Van de Werfhorst et al., 2003). These authors also presented evidence that educational systems are institutionally biased towards students who possess "cultural capital", which makes it difficult for working-class students to succeed in the education system. Furthermore, because of differential costs and benefits between class backgrounds, professional career trajectories are less easily attainable for working-class students. In the health sciences, differences in career choice have been found between low and high income family backgrounds of medical students (Cooter et al., 2004). It is not known whether such influences are as important in New Zealand, where social systems are perhaps more fluid. Neither has there been any examination of whether the cost of study—which ranged in 2006 from US$3300 per annum for physiotherapy to US$3850 for pharmacy and US$7400 for medicine/ dentistry—influences students' choice of career. Nevertheless, it is a matter for concern that the proportion of BPharm students who identify as Maori is well below the proportion of Maori in the general population (1–2% compared with 12%).

A further limitation of this study is that it was focussed to a large extent on students' intentions, which may vary over their course of study and may also not manifest in reality. Edwards, Lambert, Goldacre, & Parkhouse, (1997), for example, reported that ten years after graduating only two-thirds of medical students end up working in the field they intended to during study. It will be of value in future research therefore to ascertain the extent to which students follow through with their intentions, which will better inform the reliability and validity of this and similar survey tools and, more importantly, to what extent expectations and aspirations of pharmacy students are realised in the workplace. This would have significance for those promoting pharmacy degrees and admitting students to their courses, as to what character of advice is most appropriate and honest to offer to these aspiring professionals.

## Summary and conclusions

This study, as well as previous research across a range of cohorts, courses and countries, offers a generally consistent view of the motivations of students to study pharmacy and work as a health professional. Whereas other research has suggested that altruistic intent may be similar in importance to other factors, this study's results point to a clear prominence for this particular factor.

Scientific aspects inherent to pharmacy as a course of study also act as attractors to the subject area and pharmacy is perceived in favourable terms as offering good employment prospects with considerable entrepreneurial potential. A tendency still exists among many first year pharmacy students to have selected medicine or dentistry as a first choice, particularly among ethnic minority students, a tendency which may be declining but is likely to be to an extent inevitable, particularly with a system in which all students take the same first year curriculum. The picture among the undergraduate cohort, nevertheless, is of committed individuals who intend to pursue a pharmacy career. Gender differences were shown to emerge between aspirations to work in the different sectors, and in pharmacy ownership intentions. The perceived value of a pharmacy "passport", and intention to travel with it is very high among NSP students and will see many working overseas. Students perceived that good communication and English skills are of greatest importance when considering potential entrants to the course, a belief borne out by the literature. Yet the Pharmacy School's admissions process does not place a greater emphasis on this requirement (which is currently assessed by means of a paper on Effective Communication, provided by the University's English Department) than any of the other papers of the compulsory health sciences first year course, despite the fact that many of its students have English as a second language.

There is some concern about the extent to which students' desire and intentions to own a pharmacy will be realisable in the future and also the extent to which students' experience in community pharmacy after registration will match their expectations and preferences.

Future focus for research that elucidates the wider range of factors likely to influence students' pursuance of pharmacy, such as that which relates to family, class or cultural background is suggested. Also of importance will be work that better investigates the link between students' education and ambitions and the realities of their professional life.

## References


Abowitz, K. K. (2006). The interdependency of vocational and liberal aims in higher education. *About Campus*, *11*(2), 16–22.

American Association of Colleges of Pharmacy. (2006). Pharmacy School Admissions Requirements. Available at http://www.aacp.org/Docs/MainNavigation/InstitutionalData/6871_School_Narratives_PSAR.pdf. Accessed 20th November, 2006.

Carter, E. A., & Segal, R. (1989). Factors influencing pharmacists' selection of their first practice setting. *American Journal of Hospital Pharmacy*, *46*(11), 2294–300.

Carvajal, M. J., & Hardigan, P. (1999). Estimation of pharmacy students' expected job satisfaction functions: inter-gender differences. *American Journal of Pharmaceutical Education*, *63*, 285–289.

Census, April 1991 and 2001, Office for National Statistics, UK.

Chesnut, R. J., & Phillips, C. R. (2000). Current practices and anticipated changes in academic and nonacademic admission sources for entry-level PharmdD programs. *American Journal of Pharmaceutical Education*, *64*, 251–259.

Cline, R. R., Mott, D. A., & Schommer, J. C. (1999). Relationship between attitudes, demographics and application decisions among pre-pharmacy students: An exploratory investigation. *American Journal of Pharmaceutical Education*, *63*, 394–401.

Cockerill, R., & Tanner, J. (2001). Choosing pharmacy: The impact of gender, race and cohort on career decisions. *Journal of Social and Administrative Pharmacy*, *18*(3), 111–115.

Cooter, R., Erdmann, J. B., Gonnella, J. S., Callahan, C. A., Hojat, M., & Xu, G. (2004). Economic diversity in medical education: The relationship between students' family income and academic performance, career choice, and student debt. *Evaluation and the Health Professions*, *27*(3), 252–264.

Davey, A., Evans, A. M., & Stupans, I. (2006). Pharmacy: Factors that influence the choice of career and study options. *Pharmacy Education*, *6*(1), 21–26.

Duncan-Hewitt, W. C. (1996). Designing admissions criteria: A framework. *American Journal of Pharmaceutical Education*, *60*, 109–121.

Edwards, C., Lambert, T. W., Goldacre, M. J., & Parkhouse, J. (1997). Early medical career choices and eventual careers. *Medical Education*, *31*, 237–242.

Ferguson, J. A., Roller, L., & Wertheimer, A. I. (1986). Social factors motivating students toward a career in pharmacy. *Journal of Social and Administrative Pharmacy*, *3*(4), 127–135.

Foy, J. M., & Waller, D. M. (1987). Using British school examinations as a predictor of university performance in a pharmacy course: A correlative study. *Higher Education*, *16*(6), 691–698.

Gidman, W., & Hassell, K. (2005). Has pharmacy become a good job for women but less attractive for men? *Pharmaceutical Journal*, *275*, 604.

Hassell, K. (2003). The national workforce census: 6) the gendered nature of pharmacy employment in Britain. *The Pharmaceutical Journal*, *271*, 550–552.

Hassell, K., & Eden, M. (2006). Workforce update—joiners, leavers, and practising and non-practising pharmacists on the 2005 register. *The Pharmaceutical Journal*, *276*, 40–42.

Hatfield, K., Marriott, J., & Harper, A. (2000). Raising awareness of hospital pharmacy among undergraduate pharmacy students. *Hospital Pharmacist*, *7*(7), 199–201.

Horsburgh, M., Perkins, R., Coyle, B., & Degeling, P. (2006). The professional subcultures of students entering medicine, nursing and pharmacy programmes. *Journal of Interprofessional Care*, *20*(4), 425–431.

Miranda, N., Bates, I., & Duggan, C. (2002). Exploring cultural influences on learning behaviour: A pilot study of an international clinical pharmacy programme. *Pharmacy Education*, *2*(1), 5–10.

Pathman, D. E., & Agnew, C. R. (1993). Querying physicians' beliefs in career choice studies: The limitations of introspective casual reports. *Family Medicine*, *25*(3), 203–207.

Pharmacy Council of New Zealand: Annual Report. (2005a). Wellington, New Zealand. Report, Pharmacy Council of New Zealand. Wellington, New Zealand. http://www.pharmacycouncil.org.nz/news/documents/AR30jUNE2005.pdf. Accessed 15th October 2006.

Pharmacy Council of New Zealand. (2005b) Workforce demographics as at 1 June 2005. Report, Pharmacy Council of New Zealand. Wellington, New Zealand. http://www.pharmacycouncil.org.nz/news/documents/WebsiteReportAug05.pdf. Accessed 15th October 2006.

Pike, G. (2006). Students' personality types, intended majors, and college expectations: Further evidence concerning psychological and sociological interpretations of Holland's theory. *Research in Higher Education*, *47*(7), 801–822.

Porter, S. R., & Umbach, P. D. (2006). College major choice: An analysis of person–environment fit. *Research in Higher Education*, *47*(4), 429–449.

Pratt, R. (1956). Analysis of a pilot study of factors that motivate individuals to elect the health sciences as a career, with special reference to pharmacy. *American Journal of Pharmaceutical Education*, *20*, 175–190, Cited in Cline (1999).

Reay, D., Davies, J., David, M., & Ball, S. J. (2001). Choices of degree or degrees of choice? Class, "race" and the higher education choice. *Sociology*, *35*(4), 855–874.

Roller, L. (1993). Attitudes and demographics of students entering the victorian college of pharmacy. *Australian Pharmacist,* November, 662–666.

Roller, L. (2004). Intrinsic and extrinsic factors in choosing pharmacy as a course of study at Monash University 1999–2004. In: Peer reviewed Proceedings of the 13th International Social Pharmacy Workshop, Malta, 19-23 July 2004. *Pharmacy Education*, *4*, 199.

Seston, L., Shann, P., Hassell, K., & Willis, S. (2006). The future pharmacy workforce: Do pharmacy students want to be entrepreneurs? *Bulletin of the centre for Pharmacy Workforce Studies*, *2*, 1–4.

Sharif, S., Gifford, L., Morris, G. A., & Barber, J. (2003). Can we predict student success (and reduce student failure)? *Pharmacy Education*, *3*(2), 77–86.

Shaw, J. P. (2000). Undergraduate pharmacy education in the United States and New Zealand: Towards a core curriculum. *Pharmacy Education*, *1*, 5–15.

Silverthorne, J., Price, G., Hanning, L., Scanlan, J., & Cantrill, J. (2003). Factors that influence the career choices of pharmacy undergraduates. *Pharmacy Education*, *3*(3), 161–167.

Siracuse, M. V., Schondelmeyer, S. W., Hadsall, R. S., & Schommer, J. C. (2004). Assessing career aspirations of pharmacy students. *American Journal of Pharmaceutical Education*, *68*(3; 75), 1–12.

Smith, M. C., Gibson, J. T., & Mikeal, R. L. (1974). Reasons for choosing pharmacy as an occupation. *Drugs in Health Care*, *1*, 89–98, Cited in Cline (1999).

Strand, L. M., Cipolle, R. J., Morley, P. C., & Frakes, M. J. (2004). The impact of pharmaceutical care practice on the practitioner and the patient in the ambulatory practice setting: Twenty-five years of experience. *Current Pharmaceutical Design*, *10*(31), 3987–4001.

Van de Werfhorst, H. G., Sullivan, A., & Cheung, S. Y. (2003). Social class, ability and choice of subject in secondary and tertiary education in Britain. *British Educational Research Journal*, *29*(1), 41–62.

Willis, S., Shann, P., & Hassell, K. (2006a). Report 4: Early choices questionnaire. Analysis of the questionnaire. Studying pharmacy: Who, when, how, why? What next? *Centre for Pharmacy Workforce Studies, Manchester University.* (Summary report available in Academic Pharmacy Group Newsletter (2006),

Royal Pharmaceutical Society of Great Britain, 19 (1), 11–12. Available at: http://www.rpsgb.org/pdfs/apgnewslet0607.pdf).

Willis, S. C., Shann, P., & Hassell, K. (2006b). Career choices, working patterns and the future pharmacy workforce. *The Pharmaceutical Journal*, *277*, 137–138.

Willis, S., Shann, P., & Hassell, K. (2006c). Family-building and the future pharmacy workforce. *Bulletin of the centre for Pharmacy Workforce Studies*, *1*, 1–4.

Willis, S. C., Shann, P., & Hassell, K. (2006d). Who will be tomorrow's pharmacists and why did they study pharmacy? *The Pharmaceutical Journal*, *277*, 107–108.

Wilson, K., Jesson, J., Langley, C., Hatfield, K., & Clarke, L. (2006). Pharmacy undergraduate students: Career choices and expectations across a four-year degree programme. Report by the *Royal Pharmaceutical Society of Great Britain*. Available at http://www.rpsgb.org/pdfs/careerchoicesreport.pdf. Accessed 15th October 2006. Summary of research reported as a *Pharmaceutical Journal* (2006) editorial: Survey finds pharmacy ownership the top ambition for students. *Pharmaceutical Journal*, *277*, 407.

Wright, S. S., & Miederhoff, P. A. (1999). Selecting students with personal characteristics relevant to pharmaceutical care. *American Journal of Pharmaceutical Education*, *63*, 132–138.