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**(1) Title Page**

**Predicting Prehospital Care Students' First Year Academic Performance**

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## **(2) Acknowledgement**

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### **(3) Abstract**

**Objectives.** The study's aim was to answer two research questions. Firstly, can previously identified factors relating to academic performance be used to predict first year academic success for students undertaking a newly developed and vocationally orientated prehospital care course delivered in a rural setting? Secondly, could the study's findings be used to develop an appropriate student selection criteria to assist in the admission of students into relevant tertiary studies or the prehospital care industry? **Methods.** A retrospective review of all first year, on campus pre-hospital care students enrolled in a vocational course at a rural Australian university from 1998-2001 was conducted. Six predictors of academic performance were examined namely; UAI (University Admission Index), post-secondary educational qualifications, student entry type (traditional or mature aged), previous health related experience, gender and background (rural or urban). Three dependent variables assessed academic performance; GPA (Grade Point Average) of students who completed all required first year subjects; GPA of students who completed at least one subject in the first year and the student's ability to successfully complete first year. **Results.** UAI >50, previous health related experience, post- secondary education qualifications, background, student entry type and gender were all found to be significant predictors of first year academic performance in selective cohorts. In addition, a combination of predictors produced higher GPAs than did any single predictor. **Conclusion.** Academic performance of first year students in the prehospital care discipline can

be predicted given the appropriate selection variables. Admission selection can be assisted with the generated 'Student Selection Template'.

**Key words:** predictors; academic performance; prehospital care.

#### **(4) Introduction**

Several problems of unsatisfactory student retention and progression together with an incomplete selection criterion were evident in a newly developed, vocational orientated, prehospital care course at a rural Australian university. With increasing demand for student placement, the need arose to address these issues and satisfactorily resolve them.

A review of both the national and international literature identified literally hundreds of predictors of academic performance (Proquest, ABI, PAR, ERIC, PsycINFO & Medline). However, six predictors were selected because of their validity and reliability in the literature: previous scholastic achievement, <sup>1-11</sup> post-secondary educational qualifications, <sup>12-15</sup> age, <sup>16-21</sup> previous related experience, <sup>8, 22-27</sup> gender, <sup>6, 21, 28-29</sup> and rural verses urban background. <sup>30-32</sup> These predictors of academic performance were also similar to the anecdotal evidence reported by academics lecturing in the prehospital care course.

The use of predictors of academic performance in the pre-entry selection phase at college or university has several advantages <sup>6, 33</sup>. Firstly, it provides an effective, efficient and fair method of selecting students who will be most likely to succeed in their chosen field of study by establishing appropriate admission criteria.

Secondly, it provides students with established guidelines to make an informed decision about their suitability for specific courses. Finally, it can lead to a reduction in the amount of financial, administrative and ancillary services utilized

by the university / college and the student as a result of academic failure and student attrition.

This study identified several significant predictors of academic performance for first year students at university. These findings led to the development of a selection tool that will assist in the effective selection of prehospital care students. Further, this working template has the generalizability to assist other vocational allied health care courses with their entering student cohort selection.

## **(5) METHODS**

### **Study Design**

The study was a retrospective review of the academic performance of all first year, on campus, prehospital care students enrolled into a vocational course from 1998-2001. The four year study examined six predictors of academic performance (independent variables – IV) and compared them against three dependent variables (DV).

### **Population and Setting**

The study's sample was comprised of 135 first year students; 71 females and 64 males (see Table I). Eighty seven of the students were aged between 17-20 years of age and were admitted after the completion of secondary school (traditional entry students). The remaining 48 students were over 20 years of age and were admitted as mature entry students having delayed entry into university for a variety of reasons such as; work experience, career opportunities, travel and family.

Data relating to all first year, on campus students enrolled in the prehospital care course for the four-year period extending 1998-2001 was used in this study. The vocational course was offered through an Australian rural university.

### **Experimental Protocol**

This study examined de-identified, first year, student information, for all on campus students enrolled in a prehospital care vocational course from 1998-2001. The information of interest which was extracted from two university administrative

databases included: UAI, post-secondary educational qualifications, student entry type (traditional or mature aged), previous health related experience, gender and background (rural or urban). Students were categorized into 'urban' if they resided in a metropolitan area prior to enrolment (i.e. population > 50,000). Students were categorized into 'rural' if they resided in a non metropolitan area prior to enrolment (i.e. population <50,000).<sup>35</sup>

The predictor information was provided by the students at the time of their application to the course and as such there was no direct student participation in this study. The data was downloaded to SPSS (Statistical Package for Social Science) for further statistical analysis. The predictor information was compared against three markers of academic performance namely; GPA of students who completed all required first year subjects (see Table II for subjects & course overview); GPA of students who completed at least one subject in the first year and the student's ability to successfully complete first year.

Ethical clearance to conduct the research was sought and obtained from both the Australian rural university and Monash University's Standing Committee on Ethics in Research Involving Humans (SCERH).

### **Outcome Measures**

The six previously identified predictors were compared against three dependent variables to examine first year academic performance. A GPA between 0 - .99 indicated a failing grade, 1-1.99 a passing grade, 2.00-2.99 a credit grade, 3.00 - 3.99 a distinction grade and between 4.00- 4.99 a high distinction grade.

## **Analytical Methods**

The de-identified block data was examined using descriptive statistics. Statistical testing involved the use of a quantitative regression system known as CHAID (Categorical Hierarchical Automatic Interaction Detection), Analysis of Variance (ANOVA) and Logistic Regression Analysis. In the results section, the mean is expressed as  $\pm$  standard deviation (SD) with a 95% confidence interval (CI).

Dichotomous variables are compared using the chi-squared and Fisher's exact test, with statistical significance set at  $p < 0.05$ .

The study's results were presented in three sections. The first, displayed the results of the univariate and bivariate analysis (students that completed all subjects / students that completed at least one subject / successful completion of first year).

The second section showed the results of the CHAID analysis (students that completed all subjects / students that completed at least one subject). The final section displayed the results of the logistic regression analysis (successfully complete first year or not).

The study examined the traditional entry students and the mature entry students independently because of issues associated with missing data (i.e. only 55% of mature age students had a UAI).

The sample population size in this study was 135 students. The recommended case to IV ratio where six independent variables are utilized is 98 cases ( $N \geq 50 + 8m$ ) ( $m$  is the number of IVs) <sup>34</sup>.

## **(6) Results**

Descriptive statistics for each of the study variables cross-tabulated by student entry type (mature aged vs. traditional entry) are provided in Table III. Of those who did not successfully complete first year (n=57) 46 did not attempt to undertake all of the required subjects. Of those who did attempt all required subjects, 11 achieved a GPA of less than 1 (fail). This analysis found that 41 students had post-secondary educational qualifications. However, a higher proportion of mature entry students had these qualifications (54%) than traditional entry students (17%). Further, mature entry students were least likely to receive a failing GPA (less than 1) (19% vs. 35%) and were more likely to successfully complete first year than traditional entry students (72% vs. 49%). Overall, mature entry students received higher grades when compared to traditional entry students (credits 40% vs. 13% and distinctions 10% vs. 3%).

The results of the bivariate analysis incorporating all students found that UAI, post-secondary education, previous health related experience and student entry type were significantly related to GPA (see Tables IV & V for further details). For students who had completed all subjects, the only significant differences that were observed were that mature-entry students and those with post-secondary education achieved higher grades (see Table IV). When the analyses were conducted using students who had completed at least 1 subject (see Table V), it was found that students with a UAI of 50 or more had significantly higher GPAs than did students without a UAI, and students with a UAI of less than 50 ( $p < .05$ ). When the analysis was restricted to only traditional entry students, UAI was the

only variable found to be related to GPA. Again, students with a UAI of 50 or greater had significantly higher GPAs than did students with no UAI or a UAI of less than 50. When the analysis was restricted to only mature entry students, students with a UAI of 50 or over were found to perform significantly better than students with no UAI. In addition, the mature entry students with previous health related experience were found to perform better than students without this predictor.

Bivariate comparisons of the relationship between the independent variables and successfully complete first year indicate that male, mature entry students with a UAI of 50 or above and those students with previous health related experience were more likely to successfully complete first year (see Table VI & VII). Students with previous health related experience were 3.2 times more likely to pass first year than students without this predictor. Students with a UAI between 30 - 49 were no more likely to successfully complete first year than students who did not have a UAI. Students with a UAI between 50-69 are 4.7 times more likely to pass first year than students without a UAI. Students with a UAI over 70 are 22.5 times more likely to pass first year than students without a UAI (see Table VII).

Since similar results were achieved with the CHAID analysis, this section was not presented here.

## **(7) Discussion**

There were many similarities between the findings of the Bivariate and CHAID analyses. However, there were some noteworthy differences found when assessing the individual cohorts. This discussion section comprehensively addresses the findings and identifies significant differences.

### *Traditional Entry Students*

The results of the CHAID analysis examining traditional entry students completing all required subjects in the year found that  $UAI > 50$  was a significant predictor of academic performance. Further, that students were likely to receive a high pass (mean GPA = 1.72) for the academic year if this predictor was only utilized.

When assessing the traditional entry students against the completion of at least one first year subject, the analysis again found that  $UAI > 50$  was a significant indicator of academic performance. However, the results also indicated that previous health related experience, post-secondary educational qualifications and background were also significant predictors for this cohort. Specifically, traditional entry students who possessed a combination of predictors like post-secondary educational qualifications and urban background were likely to receive a higher academic grade for the year (mean GPA = 2.12 credit).

### *Mature Entry Students*

The results of the CHAID analysis examining mature entry students who had completed all required first year subjects found both the predictors of UAI and gender to be statistically significant. Specifically, mature entry students with a UAI > 50 received a credit grade for the academic year (mean GPA = 2.27) consistently outscoring the traditional entry students in this category with a passing grade (mean GPA = 1.72). Further, male students with No UAI / UAI < 50 consistently outperformed female students in the same cohort with male students receiving a credit for the year (mean GPA = 2.02) and female students receiving a passing grade (mean GPA = 1.22).

When examining mature entry students who had completed at least one subject in the academic year, UAI, previous health related experience and background were found to be statistically significant predictors. Specifically, mature entry students from an urban background, with previous health related experience consistently outperformed mature entry students from a rural background with previous health related experience (mean GPA = 2.48 credit vs. 1.56 pass).

### *Entire Cohort*

When analyzing the entire cohort over the academic year against the completion of all first year subjects, both UAI and student entry type were found to be statistically significant indicators of academic performance. Specifically, if students had a UAI > 50 and were mature entry they would receive a credit for the year (mean GPA =

2.27). In comparison, traditional entry students with a UAI > 50 would only receive a passing grade (mean GPA = 1.72).

When assessing the entire cohort against the completion of at least one subject in the year, UAI, post-secondary educational qualifications, student entry type, previous health related experience and background were all found to be significant indicators of academic performance. Mature entry students with a UAI > 50 consistently outperformed traditional entry students with the same UAI (mean GPA = 2.16 credit vs. 1.54 pass). Students with previous health related experience were more likely to pass the year, while students without these qualifications were more likely to fail the academic year (mean GPA = 1.38 vs. 1.35).

Students with post-secondary educational qualifications from an urban background consistently outperformed the same cohort from a rural background (mean GPA = 2.15 credit vs. 1.27 pass). Again, the trend showed students with multiple predictors demonstrating higher GPAs than students with just one single predictor.

### *Successfully Complete First Year*

The results of the third analysis (successfully complete first year – logistic regression) were not entirely consistent with the first and second analysis (completed all required subjects / completed at least one subject in the year).

Previous health related experience, UAI and gender were similarly found to be significant predictors of first year academic performance; however, post-secondary educational qualifications were not. Even though students with post-secondary

educational qualifications were found to be 1.4 times more likely to pass first year than students without these qualifications, this predictor was no longer found to be a statistically significant indicators of academic performance (see Table VI).

In comparison, gender has become a significant predictor of first year academic performance with female students one third **less** likely to complete first year than male students. These results are interesting given that there were more female enrolments than males (71vs 67) and there were no specific gender targets for enrolment (i.e. no affirmative action). Statistically, 67% of male students successfully completed first year in comparison to only 49% of female students. An analysis of the average grades of female students revealed that they are academically capable of successfully completing first year. It therefore seems apparent that these female students are unsuccessful in the first year of the course for non academic reasons. As this was a quantitative study with no direct student involvement, further qualitative research would have been necessary to capture these non academic reasons.

The variance in the findings using the three dependent variables is to be expected as these analyses addressed conceptually different issues. The first and second set of analysis afforded some insight into the capacity of students to comprehend the content and perform well in their assessments. In contrast, the logistic regression examined the likelihood that students will complete the first year of the course successfully.

## **Applications of Findings**

As a result of the identification of significant predictors of first year academic performance, an appropriate student selection tool has been proposed. This tool has the potential to not only maximize the effectiveness of course recruitment and outcome as it relates to prehospital care education, as well as assist non compliant students, but it may also aid in the selection and retention of students into ambulance services or other similar vocational allied health courses (see Table VIII).

## **Inability to Meet Selection Criteria**

The selection tool provides potential students with clear and established guidelines with which to make informed decisions about their suitability for a particular course or industry choice. However, the question needs to be asked about the potentially weaker students who do not meet the selection criteria. Many universities offer short courses to students who do not meet some of the entry criteria. These so called 'Gate Way' courses are designed to facilitate entry into the university by providing a bridging course that concentrates on the necessary academic or vocational skills required at this tertiary level. Students that do not meet the academic prerequisites could be referred to such educational institutions as TAFE (Technical and Further Education Colleges) to complete the necessary requirements, (Higher School Certificate Studies, Medical Terminology subjects, Senior First Aid Certificates and so on). Students that do not meet the vocational requirements (previous health related experience) could be referred to health

related providers in their local community for 12-24 months of related experience (area health services, community hospitals, Red Cross Association, St John Association Australia and so on).

### **Limitations**

The study has two main limitations. The first relates to incomplete or missing data. Initially, the study planned to have only one dependent variable to assess first year academic performance over two semesters. GPA was selected because of its strong support in the literature. However, early in the analysis it became clear that 27 students were not assigned a GPA in the second semester because of non enrolments, withdrawals and leave of absences. Because of these findings, a comprehensive review utilizing all students in both semesters could not occur. However, this limitation was overcome by introducing three (3) new independent variables into the study (students that completed all required first year subjects, students that completed at least one subject in the year and students that had the ability to successfully complete first year).

The second limitation relates to the interpretations of the findings of this research. Although the study's findings are significant and important for the tertiary sector and the prehospital care industry, the research only involved a small cohort of first year students at one Australian university. Currently, there are several national and international universities that have similar prehospital care programs.

Accordingly, it would be advantageous if this study was replicated to ensure consistency and reliability of its findings.

### **Further Research**

Although this study's findings can greatly assist the tertiary sector and the prehospital care industry, more investigations are necessary to continue to grow this young research environment and decrease the vocational 'gap' in the available literature. Proposed suggestions for further quantitative and / or qualitative research previously advanced in this paper have included:

- Studies testing the findings that mature-entry students attain higher grades than traditional entry students in the first year of university;
- Studies investigating the non-academic reasons why one third of first year female students were unsuccessful at university;
- Replication studies to test the findings of this Australian prehospital care study.

Additionally, several other research questions arose out of the findings of this study and warrant further investigation;

- Could other variables make prediction more accurate? Further replication studies or a desk top analysis could potentially identify other variables that lead to a greater prediction rate of first year students.

- Does first year success relate to vocational success? Follow up studies comparing the first year of university with the first year of vocational employment could provide an answer to this research question.
- How reliable are university based student selection criterion? Qualitative studies involving university and / or prehospital care industry providers could help address this interesting research question.

## **(8) Conclusion**

This study has shown that academic performance of first year students in the prehospital care discipline can be predicted given the appropriate selection variables. Further, that the generated 'Student Selection Tool' has potential application not only to the prehospital care arena, but to other courses in the allied health care field, given its consistency in the literature.

Prospective students can now have access to clear and established entry requirements into these health care disciplines as a direct result of this study. In addition, an alternative pathway can be provided for those students who are yet to meet the specific entry requirements.

## **(9) References:**

1. McDonnell, W. (1975). Testing for student selection at tertiary level: A literature review. Tertiary education entrance project. Australian Council for Educational Research, Hawthorn, Victoria.
2. Eaton, E. (1979). 'The phenomenon of student withdrawal at universities in Australia: A review of the literature concerning factors associated with academic performance and discontinuance'. Report for the AVCC working party on attrition and graduation rates, Australian National University, Canberra, November 1-2, pp.1-50.
3. Watkins, D. (1979). ' Prediction of university success: A follow-up study of the 1977 internal intake to the University of New England', *The Australian Journal of Education*, Vol. 23, No. 3, pp. 301-303.
4. Dwinell, P.L. (1985). The validation of variables used in the placement and prediction of academic performance of developmental students. Paper presented at the Annual Meeting of the American Educational Research Association, Chicago, Illinois, March 31- April 4, pp. 1-20.
5. Zachary, J.F & Schaeffer, D.J. (1994). 'Correlations between preveterinary admission variables and academic success in core courses during the first

two years of the veterinary curriculum', *Journal of Veterinary Medical Education*, Vol. 21, No. 2, pp. 72-80.

6. Stricker, L.J., Rock, D.A. & Burton, N.W. (1996). 'Using the SAT and high school record in academic guidance', *Journal of Educational and Psychological Measurement*, Vol 54, No. 4, pp. 30-39.
7. Petrie, T.A. & Stoeber, S. (1997). 'Academic and non-academic predictors of female student athletes' academic performances', *Journal of College Student Development*, Vol. 38, No. 6, pp. 23-30.
8. Ting, S.R. & Robinson, T.L. (1998). 'First year academic success: A prediction combining cognitive and psychological variables for Caucasian and African American students', *Journal of College Student Development*, Vol. 39, No. 6, pp. 17-23.
9. Garton, B.L., Dyer, J.E. & King, B.O. (1999). 'Academic performance and retention of college of agriculture students'. Proceedings of the 26<sup>th</sup> Annual National Agricultural Education Research Conference (NAERC), Florida, USA.

10. McKenzie, K. & Schweitzer, R. (2001). 'Who succeeds at University? Factors predicting academic performance in first year Australian students', *Higher Education Research & Development*, Vol. 20, No. 1, pp. 21-34.
11. Yin, T., & Burger C. (2003). ' Predictors of NCLEX-RN Success of Association Degree Nursing Graduates', *Nurse Educator*, Volume 28, No 5, pp.232-236.
12. Power, C., Robertson, F. & Baker, M. (1987). Success in higher education, Australian Government Publishing Service, Canberra.
13. Parameswaran, M. (1991). 'A comparison of academic success of mature age and traditional entrance at the Victorian College of Agriculture and Horticulture'. Paper presented at the AAIR Forum Proceedings at the Dookie Campus, May 14-16, Melbourne.
14. Dobson, I.R. & Sharma, R. (1993). 'Students progress: A study of the experience in Victorian tertiary institutions', *The Journal of Tertiary Education Institutions*, Vol. 15, No. 2, pp. 203-212.
15. Dobson, I., Sharma, R. & Haydon, A. (1996). Evaluation of the relative performance of commencing undergraduate students in Australian universities, Paragon Printers, Canberra.

16. Marshall, H. & Nicholson, P. (1991). 'Why choose psychology? Mature and other students' accounts at graduation', in J. Radford (eds). *The Choice of Psychology, Occasional Paper*, The British Psychological Society, Leicester, London.
17. Molloy, S. & Carrol, V. (1992). *Progress and performance in higher education*, CNNA, London.
18. Hartley, J., Trueman, M. & Lapping, C. (1993). 'The performance of mature and traditional entry students at Keele University: An analysis of archival data'. Paper presented to the British Psychological Society, December, London.
19. Richardson, J.T.E. (1994a). 'Mature students in higher education: Academic performance and intellectual ability', *Journal of Higher Education*, Vol. 28, pp. 373-386.
20. Richardson, J.T.E. (1994b). 'Mature students in higher education: A literature review on approaches to studying', *Journal of Studies in Higher Education*, Vol. 19, pp. 309-325.

21. Trueman, M. & Hartley, J. (1996). 'A comparison between the time management skills and academic performance of mature and traditional-entry university students', *Journal of Higher Education*, Vol. 32, pp. 199-215.
22. McCauley, D.P. (1985). 'Effects of specific factors on Blacks' persistence at a predominately White university', *Journal of Counseling and Development*, Vol. 29, pp. 48-51.
23. Hood, D.W. (1992). 'Academic and non-cognitive factors affecting the retention of Black men at a predominately White university', *Journal of Negro Education*, Vol. 61, pp. 12-23.
24. Ting, S.R. (1997). 'Estimating academic success in the 1<sup>st</sup> year of college for specially admitted white students: A model combining cognitive and psychological predictors', *Journal of College Student Development*, Vol. 38, No. 4, pp. 1-7.
25. Keef, S.P. & Hooper, K.C. (1991). 'Prior accounting education and performance in a first level university course in New Zealand', *Journal of Accounting and Finance*, Vol. 31, pp. 85-91.

26. Robbins, S.B., Lauver, K, Le, H., Davis, D., Langley, R. & Carlstrom, A. (2004). 'Do psychosocial and study skill factors predict college outcomes? A meta-analysis', *Psychological Bulletin*, The American Psychological Association, Volume 130, No 2, pp. 261-288.
27. Rohde, F.H. & Kavanagh, M. (1996). 'Performance in first year university accounting quantifying the advantage of secondary school accounting', *Journal of Accounting and Finance*, Vol. 36, pp. 275-285.
28. Jenkins, E.K. (1998). 'The significant role of critical thinking in predicting auditing students' performance, *Journal of Education for Business*, Vol. 53, No. 5, pp. 274-279.
29. Kleinfield, J. (1999). 'Student performance: Males versus females', *Journal of Public Interest*, Vol. 134, pp. 3-20.
30. Downey, R.G. (1980). 'Higher education and rural youth paper'. Paper presented at the annual Kansas State University Rural and Small Schools Conference, Auburn, AL, August 1980. ED 201459.
31. Edlington, E.D., Everett, D. & Maetellaro, H.C. (1984). 'Variables affecting academic achievement in New Mexico schools', New Mexico Centre for Rural Education, Las Cruces. ERIC Digest, 271267.

32. Hemmings, B, Kay, R. & Hill, D. (1997). 'Rural students continuing their studies in university contexts'. Celebrating Rural Education, Proceedings of the National Conference of the Society for Provision of Education in Rural Australia (SPERA), Adelaide, South Australia, July 6-8.
33. Griffiths, M.J., Bevil, C.A., O'Connor, P.C. & Wieland, D.M. (1995). 'Anatomy and physiology as a predictor of success in baccalaureate nursing students', *Journal of Nursing Education*, Vol. 34, No. 2, pp. 61-66.
34. Tabachnick, B.G. & Fidell, L.S. (2001). Using Multivariate Statistics, 4<sup>th</sup> edn, Harper Collins, New York.
35. Zhang, W., Bowman, A. & Mueller K.J. (1998). Rural / Urban Definitions: Alternatives and Numbers by State. Project Report 98-1 prepared for The National Rural Health Association, Rural Health Policy Board, Nebraska Center for Rural Health Research, University of Nebraska Medical Centre, Omaha, NE, USA.

## (10) Tables

Table I

Description of study participants' age, sex and mode of entry to university

Sample characteristic	Males	Females	Total
Sample number	64	71	135
Average age (SD)	21.14(5.36)	19.96 (3.37)	20.52(4.45)
Traditional Entry Students	50	37	87
Mature Aged Entry Students	21	27	48

Table II: Description of first year subjects

Subject	Description
<i>First Semester</i>	
Clinical Studies 1A	A practical based clinical subject that assists students to formulate treatment plans by understanding the manifestations of disease and the importance of assessment findings. This introductory subject examines such general topics as patient assessment, communicable diseases and the management of cardiac and respiratory arrest.
Paramedical Science 1A	A theoretical based subject that examines human anatomy and physiology and assists in linking 'theory to practice' with sister subject Clinical Studies 1A.
Prehospital Care 1	A theoretical subject involving the recognition and understanding of several theories of health.
Professional Studies 1	A theoretical subject that focuses on communication skills appropriate to the work of ambulance officers.
<i>Second Semester</i>	
Clinical Studies 1B	A practical based clinical subject that increases the student's understanding of the manifestations of disease. Further topics include the understanding and management of hemorrhage, shock and cardiovascular and respiratory problems. The subject then links these topics with the implementation of appropriate treatment plans specifically designed for the pre-hospital care environment.
Paramedical Science 1B	A theoretical based subject that further develops the student's understanding of human anatomy and physiology by specifically linking topics introduced in Clinical Studies 1B.
Clinical Internship 1	This subject introduces the student to the pre-hospital care environment with a range of clinical practicums. Assessment tasks and evaluation reports assist the student with specific learning objectives.
Paramedical Issues	A theoretical based subject designed to provide the student with an introduction to common ethical and legal issues in the pre-hospital care environment.

The three year prehospital care course contains 24 subjects. Students are required to complete four subjects per semester with two semesters per year. There are a variety of topics in second and third year (i.e. pathophysiology, evidence based practice, PHC research, advanced pharmacology & clinical studies, health service management etc).

Table III

Descriptive statistics for each of the study variables cross-tabulated by student entry type (mature vs. traditional)

Variable	Student Entry Type					
	Traditional (n=87)		Mature Age (n=48)		Total (N=135)	
	N	%	n	%	N	%
Previous Scholastic Achievement (UAI)						
None / Missing	24	28%	22	46%	46	34%
< 50	18	21%	7	15%	25	19%
50 or more	45	52%	19	40%	64	47%
Post-Secondary Education						
Yes	15	17%	26	54%	41	30%
No	72	83%	22	46%	94	70%
Previous Health Related Experience						
Yes	29	33%	30	63%	59	44%
No	58	67%	18	38%	76	56%
Gender						
Male	37	43%	27	56%	64	47%
Female	50	57%	21	44%	71	53%
Background						
Rural	45	52%	27	56%	72	53%
Urban	42	49%	21	44%	63	47%
GPA*						
0-0.99	30	35%	9	19%	39	29%
1-1.99	43	49%	15	31%	58	43%
2.0-2.99	11	13%	19	40%	30	22%
3.0-3.99	3	3%	5	10%	8	6%
Successfully completed first year						
Yes	43	49%	34	72%	78	58%
No	44	51%	13	27%	57	42%

\*For students completing at least one subject.

Table IV

Relationship between individual predictor variables and grade point average (GPA) for students undertaking all first year subjects

Predictor Variable	GPA Mean (SD)		
	Traditional (n = 49)	Mature Age (n = 40)	Total (N = 89)
Previous Scholastic Achievement (UAI)	F = 2.57	F = 2.62	F = 2.99
None / Missing	1.31 (.49)	1.70 (.78)	1.55 (.70)
0-49	1.35 (.63)	1.75 (.89)	1.56 (.76)
50-100	1.72 (.61)	2.27 (.71)	1.91 (.69)
Post Secondary Education	F = 0.05	F = 1.40	F = 4.08*
No	1.58 (.58)	1.78 (.65)	1.64 (.61)
Yes	1.63 (.72)	2.08 (.89)	1.95 (.85)
Previous Health Related Experience	F = 0.25	F = 1.75	F = 3.57
No	1.55 (.61)	1.71 (.93)	1.60 (.72)
Yes	1.64 (.60)	2.07 (.72)	1.88 (.70)
Gender	F = 1.47	F = 1.13	F = 0.02
Male	1.49 (.60)	2.07 (.68)	1.76 (.69)
Female	1.70 (.60)	1.79 (.94)	1.73 (.75)
Background	F = 1.32	F = 2.68	F = 2.71
Rural	1.48 (.55)	1.79 (.77)	1.63 (.78)
Urban	1.68 (.65)	2.20 (.80)	1.88 (.75)
Student Entry Type			F = 6.02*
Traditional Entry			1.59 (.60)
Mature Age			1.95 (.80)

\* p < .05.

Table V

Relationship between individual predictor variables and grade point average (GPA) for students undertaking at least one first year subject

Predictor Variable	GPA Mean(SD)		
	Traditional (n = 87)	Mature Age (n = 48)	Total (N = 135)
Previous Scholastic Achievement (UAI)	F = 9.16*	F = 2.86	F = 8.66*
None / Missing	1.00 (.84)	1.57 (.89)	1.27 (.91)
0-49	.78 (.66)	1.58 (.92)	1.01 (.81)
50-100	1.55 (.66)	2.17 (.74)	1.73 (.74)
Post-Secondary Education	F = 2.22	F = 3.73	F = 13.82*
No	1.18 (.75)	1.55 (.76)	1.26 (.76)
Yes	1.51 (.91)	2.03 (.91)	1.84 (.93)
Previous Health Related Experience	F = 1.28	F = 5.64*	F = 10.80*
No	1.17 (.82)	1.44 (.94)	1.23 (.86)
Yes	1.37 (.67)	2.03 (.76)	1.71 (.79)
Gender	F = 0.15	F = 0.05	F = 0.82
Male	1.28 (.83)	1.83 (.85)	1.51 (.87)
Female	1.21 (.75)	1.78 (.92)	1.37 (.84)
Background	F = 2.86	F = 0.99	F = 2.82
Rural	1.10 (.70)	1.70 (.77)	1.33 (.77)
Urban	1.38(.85)	1.95 (.99)	1.57 (.93)
Student Entry Type			F = 15.22*
Traditional Entry			1.23 (.78)
Mature Aged			1.81 (.87)

\* p < .05.

Table VI

Relationship between individual predictor variables and the successful completion of first year

Predictor Variable	Successfully Completed First Year	
	No	Yes
	57 (42%)	78 (58%)
Previous Scholastic Achievement (UAI)*		
None / Missing	24 (52%)	22 (48%)
<50	15 (60%)	10 (40%)
>50	18 (28%)	46 (72%)
Post- Secondary Education ‡		
No	44 (47%)	50 (53%)
Yes	13 (32%)	28 (68%)
Previous Health Related Experience* ‡		
No	41 (54%)	35 (46%)
Yes	16 (27%)	43(73%)
Gender*		
Male	21 (33%)	43 (67%)
Female	36 (51%)	35 (49%)
Background		
Rural	31 (43%)	41 (57%)
Urban	26 (41%)	37 (58%)
Student Entry Type* ‡		
Traditional Entry	44 (51%)	43 (49%)
Mature Age	13 (27%)	35 (73%)

\* p &lt; .05 (Pearson Chi-Square)

Table VII  
Results of Logistic Regression Analysis

Effect	Beta Co-Efficient	Standard Error	Sig.	Odds	95% Lower	CI Upper
Male vs. Female	-.917	.443	.038	<b>.396</b>	.166	.954
Mature vs. Traditional	.557	.491	.257	<b>1.745</b>	.6634	4.596
Urban vs. Rural	-.145	.414	.721	<b>.861</b>	.3812	1.945
Qualifications vs. None	.452	.511	.375	<b>1.471</b>	.572	4.307
Health Experience vs. None	1.181	.453	.008	<b>3.167</b>	1.335	7.987
UAI						
30-49 vs. None	-.025	.5426	.954	<b>.969</b>	.331	2.830
50-69 vs. None	1.565	.568	.006	<b>4.706</b>	1.562	14.759
70-100 vs. None	3.154	.752	.000	<b>22.571</b>	5.362	103.03
Constant	-.554	.560	.322	<b>.572</b>		

The strength of the effect can be gauged by the 'odds' column, which represent the ratio of the likelihood that students in one group will pass the first year and the likelihood that other students will not pass. It should be noted that the 95% confidence interval for the UAI variable between 70 and 100 has a large range because there were only three students in this group. Hence, the estimates of the 'odds' category is likely to be unstable.

Table VIII

Selection tool showing admissions guidance for entry into relevant tertiary studies or the prehospital care industry

### Entry Requirements for:

- Prehospital Care Undergraduate Degree Courses
- Vocational Allied Health Care Courses
- Ambulance Service Admittance (Direct, Graduate or Overseas Entry)

### Admission Guidance:

#### **Minimum Requirements for Traditional Entry Students (17-20 years)**

NSW HSC (or recognized equivalent) with UAI scores greater than 50

If no UAI or UAI <50 student will likely perform better if they have Post-Secondary Educational Qualifications

If no UAI or UAI < 50 and *no* Post-Secondary Educational Qualifications, student should perform better if they have Previous Health-Related Experience, particularly if they are from an Urban Background

#### **Minimum Requirements for Mature-Entry Students (20+ years)**

Mature-entry students will likely pass and complete first year, however they will generally perform better if they have a UAI of > 50 and / or Previous Health Related Experience.