

NATIONAL PRESCRIBING CURRICULUM (NPC) SURVEY OF STUDENTS

Steven Riddell - November 2010



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OVERVIEW

In October 2010, NPS emailed all registered National Prescribing Curriculum (NPC) students a survey for voluntary completion.

The survey was designed to gain an understanding of student's attitudes towards the NPC in terms of usability, content and usefulness.

Key results:

- There was a good response rate (approximately 10%) given it was an online survey.
- Responses are representative of the 2009/10 NPC users by course (medicine, pharmacy and nurse practitioner).
- Chronic obstructive pulmonary disease, chronic heart failure and post-operative pain management were the topics completed by the most respondents.
- Attitudes toward NPC were overwhelmingly positive.
- Perceived impact on knowledge and confidence in prescribing are encouraging.
- Expert feedback is identified as very useful.
- More work could be undertaken to involve academic staff in NPC promotion.
- NPS and its resources could be further promoted in the modules.
- Navigation and length of modules may need to be improved in any further NPC development.
- Although the response rate is good, results have to be interpreted carefully as there could be some response bias from those who are generally happy with the NPC modules.

INTRODUCTION

NPS currently provides Australian universities access to a number of online modules facilitating good prescribing practices in student health professionals. These modules are known as the **National Prescribing Curriculum** (NPC). Currently there are 25 universities using the modules and 9 'other' institutions (e.g. Royal Brisbane Women's Hospital). Recent changes to the modules have included re-release of some modules, development and release of new modules and a new hosting platform for the modules.

Results of the previous NPC student survey in 2008/09 indicated that students felt that the modules improved their confidence in prescribing, and they were satisfied with the level of guidance and assistance they receive. Furthermore, they were satisfied with the content and layout of the modules.

Previous surveys of NPC students have been limited to medical students only but have also been subject to poor response rates. Evaluation surveys of the NPC in the past have also been promoted and distributed by university staff (lecturers/course coordinators). This is the first evaluation of students where they have been approached directly by NPS to complete the questionnaire.

The objectives of the survey are:

To gain an understanding of students' (medicine, pharmacy, nurse practitioner, other):

- view on the modules' usability, usefulness perception of module contents and relevance and barriers to completion
- attitude toward NPS.

METHODS

Sampling

Candidates for the survey included all NPC registered students. Completion of the survey was voluntary and several prizes were offered as incentive for completion.

Five randomly drawn respondents who provided a return email address upon completing the survey were awarded a voucher for the 2011 version (winner's choice of format) of the Australian Medicines Handbook. Email addresses received by NPS were stored on a separate database to the questionnaire responses to ensure anonymity. Permits from ACT and NSW for Trade Promotions were granted (NSW Permit No (LTPS/10/08816), ACT Permit No (TP 10/04064)).

Questionnaire design

The cross-sectional questionnaire was designed in-house by the Evaluation and Educational Design and Support teams (see Appendix 1). The online survey and data collection tools were built by the IT team. It was assumed that there would be three distinct target audiences for the survey – those who had completed at least one module, those who had started a module (but not completed), and those who had registered but not started a module at all. After completing some basic demographic questions and a number of questions common to each audience, the three groups were then directed to three different surveys to complete.

All students registered with the NPC were included in the email distribution list (N=4,339). It was expected that the survey would take approximately 15 minutes to complete. A list of email addresses was provided to the Publishing team for external delivery. All registered students were emailed an invitation email containing a link to the survey (17 September 2010). A reminder email was also sent (12 October 2010). The survey was open until 22 October 2010.

Data management and analysis

The survey responses were stored on a server located at NPS. Data was extracted in Excel format. Quantitative data was analysed using SPSS v.19. Descriptive statistics were calculated for all variables. Analysis was undertaken for all questions of all applicable respondents.

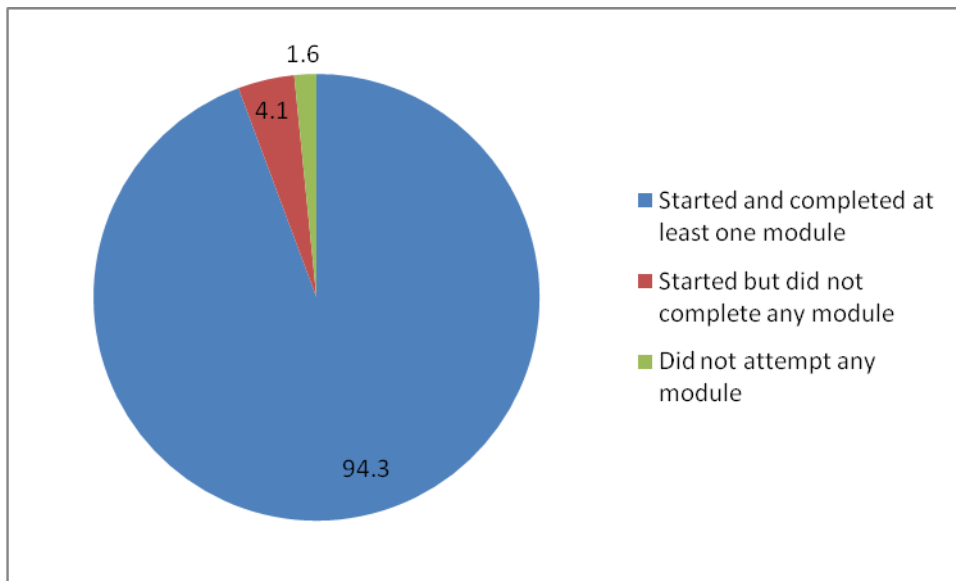
Qualitative responses were analysed using a structured process in which key phrases and concepts were identified, the data categorised, and recurring themes and issues recorded. The emphasis in analysing these sections of the survey is qualitative rather than quantitative, however where appropriate, quantitative estimates of some responses have been provided to indicate overall salience. Key phrases that reflect the major themes are reported where possible.

RESULTS

Characteristics of Participants

A total of 442 (10.2%) valid surveys were submitted online to NPS. Of those responses, almost all respondents had completed at least one module (94.3%, n=417) (Figure 1). For the remainder of this report, this group of students will be referred to as 'completers' and the other two groups as 'starters' and 'non-starters'.

Figure 1: Proportion of respondents who completed a module



Given the high proportion of respondents who had completed at least one module, the demographic data presented below will be for both the entire sample and for the sub-sample of 'completers'.

Among the entire sample almost two thirds were female (66.1%, n=292). This was also reflected in the sub-sample of 'completers' (64.7%, n=270).

The highest proportion of respondents were from New South Wales (NSW) (28.3%, n=125) (Table 1). The next highest proportion of respondents were from Victoria (VIC) (21.3%, n=94) and Queensland (QLD) (16.1%, n=71); there was also considerable response from Tasmania (TAS) (14.3%, n=63).

Table 1: State of respondents

State of respondent	All (N=437) % (n)	Completers (N=413) % (n)
NSW	28.3 (125)	28.8 (119)
VIC	21.3 (94)	21.5 (89)
QLD	16.1 (71)	13.8 (57)
TAS	14.3 (63)	14.8 (61)
SA	9.0 (40)	9.4 (39)
WA	8.4 (37)	8.7 (36)
ACT	1.6 (7)	1.7 (7)
NT	1.1 (5)	1.2 (5)

Approximately 80% of all respondents and 'completers' were studying medicine. The remaining respondents were made up primarily of pharmacy students (14.1%, n=62) and nurse practitioners and dentistry students. The responses are relatively representative of the students registered on the NPC for 2009/10 (Table 2).

Among the 18 'starters', most (55.6%, n=10) studied medicine and there was also a number of nurse practitioners (27.8%, n=5).

See Appendix 2 for a breakdown of demographics by medical and pharmacy student.

Table 2: Course studied by respondent

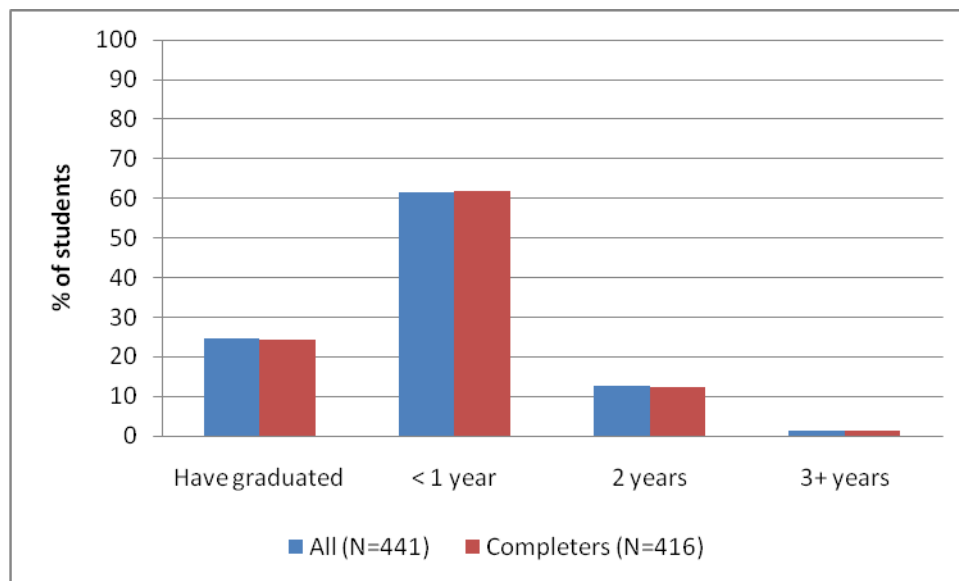
	All (N=441) % (n)	Completers (N=416) % (n)	2009/10 Student #'s % (n)
Medicine	79.6 (351)	80.8 (336)	85.6 (1,829)
Pharmacy	14.1 (62)	14.2 (59)	12.2 (260)
Nurse Practitioner	4.8 (21)	3.6 (15)	1.8 (39)
Other*	1.6 (7)	1.4 (6)	0.4 (8)

*Other – this group in the student survey was made up entirely of Dentists

Almost two thirds of students (61.5%, n=271) had less than one year to complete before graduation. In addition, a further quarter of the respondents had already completed their studies. This pattern of response is a reflection of the placement of the modules in the later stages of the curriculum (Figure 2).

Of the 'starters', almost 90% (n=16) had either less than one year to graduation or had already graduated.

Figure 2: Years to graduation



Survey results

Completion of modules

Although the greatest proportion of respondents indicated that some or all of the modules were compulsory (58.1%, n=257), it is also of note that almost one quarter of those who completed a module indicated that they were not compulsory (22.3%, n=93) (Table 3). A quarter of all respondents also indicated that the modules were linked to assessment (25.6%, n=113).

Among the 'starters', 61.1% (n=11) indicated that the modules were not compulsory. There were however, three students who did indicate that the modules were compulsory.

Table 3: Use of the modules in the curriculum

	All % (n)	Completers % (n)
Modules not compulsory	24.7 (109)	22.3 (93)
Some/all modules compulsory	58.1 (257)	60.4 (252)
Some/all module completion counted to course mark	12.7 (56)	13.4 (56)
Some/all modules linked to assessment	25.6 (113)	26.4 (110)
Other	4.1 (18)	3.6 (15)

*Mark all that apply

Students most commonly completed 4 modules (14.9%, n=62). There were, however, 52 students (12.5%) who completed all 25 modules (Table 4).

There were also 10 students (2.4%) who indicated that they had completed a module but did not indicate which modules they had completed.

Among the 'starters', there were two students who had each started four, three and two modules with the remaining 12 students starting one module only.

Table 4: Number of students who completed multiple modules (N=416)

Number of modules completed	Number of students (n)	%
1-4	155	37.3
5-9	99	23.8
10-14	44	10.6
15-19	26	6.3
20-24	31	7.5
25	52	12.5

Chronic obstructive pulmonary disease (COPD) was the module completed by the greatest proportion of students (63.8%, n=266). This is also the first module to be displayed in the series of modules which may influence the uptake and completion by students. COPD was also the most popular module among the 'starters' (61.1%, n=11).

Other frequently completed modules include chronic heart failure (59.2%, n=247), post-operative pain (56.1%, n=234) and acute pulmonary oedema in chronic heart failure (49.2%, n=205).

It is of note in that there is considerable bunching among 6 modules which were completed by 46% to 49% of the students (Table 5).

Table 5: Top 10 modules completed

	% (n)
COPD	63.8 (266)
Chronic heart failure	59.2 (247)
Post-operative pain	56.1 (234)
Acute pulmonary oedema in chronic heart failure	49.2 (205)
Polypharmacy in multiple system failure	48.9 (204)
Anticoagulation in atrial fibrillation	48.0 (200)
Acute coronary syndrome	48.0 (200)
Prophylaxis of deep vein thrombosis	47.0 (196)
Confusion in an elderly woman	46.3 (193)
Urinary tract infection	43.6 (182)

Not surprisingly, modules which were released only recently (in the last 6 months), were completed by the smallest proportion of students (Table 6). These modules include management options to maximise sleep, long term management of type 2 diabetes – Parts 1 and 2, and respiratory tract infection in a child.

Among the older modules (those released for 12 months or more), adolescent mental health (28.3%, n=118) and improving glycaemia control in long established diabetes (28.3%, n=118) were completed by the least number of students.

Table 6: Least completed modules

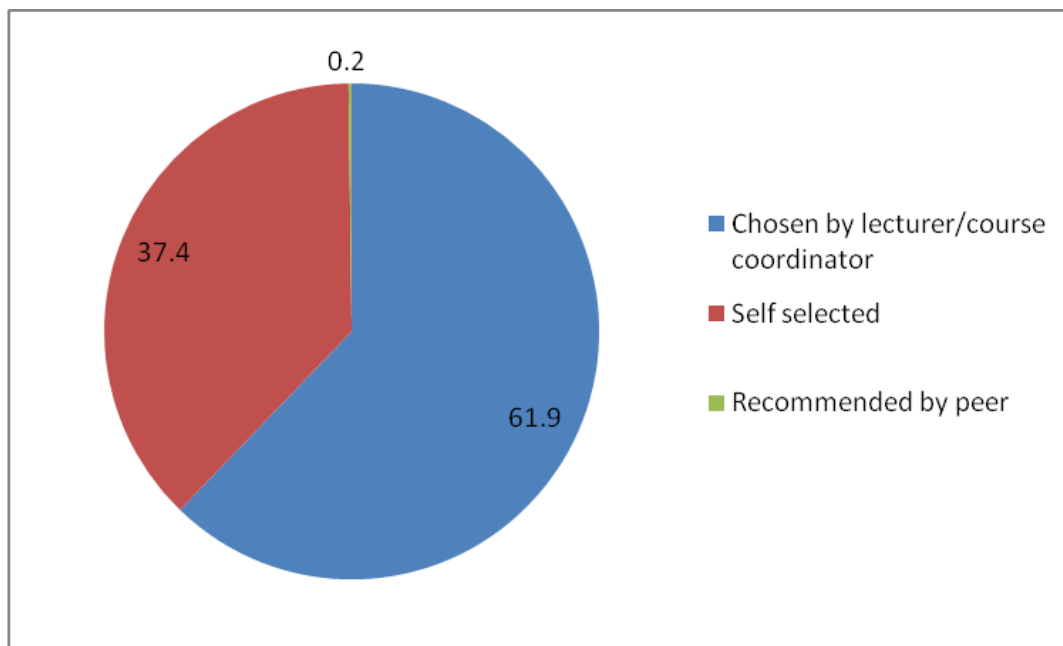
	% (n)
Management options to maximise sleep**	17.3 (72)
Long term management of type 2 diabetes – Part 2**	22.8 (95)
Respiratory tract infection in a child**	23.7 (99)
Long term management of type 2 diabetes – Part 1**	24.7 (103)
Adolescent mental health	28.3 (118)
Improving glycaemia control in long established diabetes	28.3 (118)
Hypertension in asthma	30.5 (127)
Narcotic analgesic dependency	31.2 (130)
Confusion associated with alcohol withdrawal	33.3 (139)
Generalised seizure	34.8 (145)

**Recently released modules

The majority of students indicated that the modules completed were chosen by the lecturer/course coordinator (61.9%, n=258). More than a third, however, indicated that the modules they had chosen were self-selected potentially indicating selection due to a gap in knowledge or interest in the topic (37.4%, n=156) (Figure 3).

Less than half (44.4%, n=8) 'starters' indicated that they were chosen by a lecturer with most indicating the modules were self selected (55.6%, n=10).

Figure 3: Selection of module completion (N=415)



Overwhelmingly the modules were completed individually (93.0%, n=388); however, there were a number of students who completed the modules both individually and as part of their class work (10.3%, n=43). All 18 'starters' undertook the modules individually.

Students' attitude

The general attitude among the student responses towards the module tasks, content, relevance and navigation was overwhelmingly positive (Table 7). There was very high agreement (approximately 95%) that the module tasks were engaging, that the instructions easy to follow, the content clearly presented and that the modules were relevant to (anticipated) clinical experience.

There was also encouraging results in regards to the module learning objectives which were found to be clear. The tasks in the modules were also found to adequately address the objectives (approximately 95% agreement).

Interestingly, more than 40% of students indicated that they would **not** be more motivated to complete the modules if they were formally assessed.

Approximately 30% indicated that the modules did not increase awareness of other NPS products, suggesting improvement could be made in the promotion in the modules of other NPS resources.

There was some disagreement (approximately 20%) in the ease of navigation of the modules.

Table 7: Attitudes toward content, navigation, learning objectives and other aspects of the modules

	Strongly agree % (n)	Agree % (n)	Disagree % (n)	Strongly disagree % (n)
Module tasks were engaging (N=415)	22.2 (92)	74.0 (307)	3.6 (15)	0.2 (1)
Instructions easy to follow (N=414)	29.0 (120)	65.5 (271)	5.3 (22)	0.2 (1)
Content clearly presented (N=414)	29.5 (122)	66.7 (276)	3.6 (15)	0.2 (1)
Relevant to (anticipated) clinical experience (N=414)	37.7 (156)	58.9 (244)	3.4 (14)	0
More motivated if formally assessed (N=414)	21.0 (87)	38.9 (161)	37.2 (154)	2.9 (12)
Links to other resources useful (N=415)	23.4 (97)	61.4 (255)	14.7 (61)	0.5 (2)
Increased awareness of other NPS resources (N=415)	18.1 (75)	51.3 (213)	28.2 (117)	2.4 (10)
Learning objectives clear (N=415)	21.2 (88)	73.0 (303)	5.3 (22)	0.5 (2)
Tasks addressed the learning objectives (N=417)	23.2 (95)	73.7 (302)	2.9 (12)	0.2 (1)
Easy to navigate (N=413)	22.3 (92)	56.7 (234)	17.9 (74)	3.1 (13)

Perception of usefulness of NPC

Approximately 90% of 'completers' positively responded when asked about the impact of the modules on developing critical appraisal skills and, and whether the modules were effective in testing understanding of the content rather than just memory.

More than 90% of 'completers' agreed or strongly agreed that the feedback was adequate to guide decision making. Almost all students considered the feedback from experts to be useful (51.8% strongly agreed and 45.5% agreed). The usefulness of access to peers' answers and ideas was less but at 80% agreement, the result is still very positive (Table 8).

There were also 20% of students who indicated that they were not encouraged to complete the modules and may indicate room for further promotion among academic staff.

Table 8: Attitude towards module feedback, developing skills and encouragement to complete

	Strongly agree % (n)	Agree % (n)	Disagree % (n)	Strongly disagree % (n)
Effective for developing critical thinking skills (N=412)	23.3 (96)	64.6 (266)	11.2 (46)	1.0 (4)
Tests tested my understanding – not just memory (N=414)	28.3 (117)	64.5 (267)	6.3 (26)	1.0 (4)
Expert feedback was useful (N=413)	51.8 (214)	45.5 (188)	2.7 (11)	0
Adequate feedback to guide decision making (N=412)	24.0 (99)	65.5 (270)	9.7 (40)	0.7 (3)
I was encouraged to complete NPC modules (N=414)	22.2 (92)	57.7 (239)	17.1 (71)	2.9 (12)
Access to peers' answers/ideas useful (N=414)	22.9 (95)	56.8 (235)	17.9 (74)	2.4 (10)

Perceived impact

Knowledge and confidence in prescribing after completing the NPC modules were both found to be positively influenced. There was 90% agreement among students (almost 30% of which was strong agreement) that their knowledge of the topics covered and prescribing process were both improved as a result of completing the modules.

A further positive outcome noted was the students' perceived confidence to prescribe appropriately and, their perception that they were better prepared to prescribe or recommend therapeutic options appropriately (Table 9). Approximately 90% of students agreed or strongly agreed that they felt more confident in their ability to prescribe or recommend an appropriate therapeutic option after completing the modules.

Table 9: Effect of modules on knowledge and confidence

	Strongly agree % (n)	Agree % (n)	Disagree % (n)	Strongly disagree % (n)
Knowledge of therapeutic topics covered has improved (N=416)	28.8 (120)	65.9 (274)	4.8 (20)	0.5 (2)
Knowledge of the prescribing process improved (N=414)	27.1 (112)	63.0 (261)	9.9 (41)	0
Feel more confident in ability to prescribe/recommend appropriate therapeutic option (N=411)	20.4 (84)	68.1 (280)	10.7 (44)	0.7 (3)
Feel better prepared to prescribe/recommend appropriately (N=415)	19.8 (82)	70.6 (293)	8.9 (37)	0.7 (3)

Comparisons were also made between students studying medicine and pharmacy (Table 10). Although high proportions of both groups of student indicated that the modules were relevant to their anticipated clinical experience, a significantly higher proportion of medical students agreed with this statement than pharmacy students ($\chi^2 = 21.4$, $p \leq 0.001$).

Perceived improvement in knowledge of the prescribing process resulting from completing the modules was found to be significantly greater among medical students than pharmacy students ($\chi^2 = 15.3$, $p \leq 0.001$).

In regards to confidence, a significantly greater proportion of medical students than pharmacy students agreed that after completing the modules they feel better prepared to prescribe/recommend an appropriate therapeutic option ($\chi^2 = 5.1$, $p = 0.021$).

A significantly greater proportion of pharmacy students did agree however, that the modules increased awareness of other NPS resources ($\chi^2 = 3.9$, $p = 0.049$).

Table 10: Comparison between medicine and pharmacy students**

	Medicine Agree* % (n)	Pharmacy Agree* % (n)	$\chi^2 =$, p= Completers	$\chi^2 =$, p= All
Relevant to (anticipated) clinical experience	98.8 (330)	87.9 (51)	21.4 $p \leq 0.001$	21.3 $p \leq 0.001$
Increased awareness of NPS resources	66.3 (222)	79.3 (46)	3.9 $p = 0.049$	Not significant
Feel better prepared to prescribe/recommend appropriately	92.2 (307)	83.1 (49)	5.1 $p = 0.021$	N/A*
Knowledge of the prescribing process improved	92.5 (308)	75.9 (44)	15.3 $p \leq 0.001$	N/A*

Note: These two statements were only asked of students who had completed a module

* For this analysis, strongly agree and agree were combined, as was strongly disagree and disagree

** Only statements where a significant difference was noted between medical and pharmacy students are listed in Table 11.

Comparisons were also carried out between medical students and all other students (Table 11). In the most part, the results reflect those above when medical students are compared to pharmacy students.

As above, a significantly higher proportion of medical students agreed that the modules are relevant to their anticipated clinical experience compared to 'other' students ($\chi^2 = 25.6$, $p \leq 0.001$). In addition, a significantly greater proportion of pharmacy students agreed that the modules did increase awareness of other NPS resources compared to medical students ($\chi^2 = 3.9$, $p = 0.049$).

In regards to knowledge of the prescribing process and confidence relating to prescribe/recommend an appropriate therapeutic option, a significantly greater proportion of medical students agreed to the positive impact of completing the modules ($\chi^2 = 7.0$, $p = 0.008$ and $\chi^2 = 11.6$, $p \leq 0.001$ respectively).

There were two additional significant results than the comparisons above. Firstly, 'other' students were significantly more likely to be encouraged by a lecturer/course coordinator to complete the modules compared to medical students ($\chi^2 = 4.4$, $p = 0.036$). In addition, all 'other' students (100%, $n = 79$) agreed that the content was clearly presented, significantly greater than the agreement among medical students ($\chi^2 = 3.9$, $p = 0.047$). It is of note however that this result is only marginally significant and, that 95% of medical students also agreed with this statement.

Table 11: Comparison between medicine and all other students**

	Medicine Agree* % (n)	Other Agree* % (n)	$\chi^2 =$, p= Completers	$\chi^2 =$, p= All
Relevant to (anticipated) clinical experience	98.8 (330)	87.3 (69)	25.6 $p \leq 0.001$	23.6 $p \leq 0.001$
Increased awareness of NPS resources	66.3 (222)	82.3 (65)	7.7 $p = 0.006$	6.0 $p = 0.014$
Content clearly presented	95.2 (318)	100 (79)	3.9 $p = 0.047$	4.8 $p = 0.029$
Was encouraged to complete modules	78.1 (261)	88.6 (70)	4.4 $p = 0.036$	Not significant
Feel better prepared to prescribe/recommend appropriately	92.2 (308)	82.5 (66)	7.0 $p = 0.008$	N/A*
Knowledge of the prescribing process improved	92.5 (309)	79.7 (63)	11.6 $p \leq 0.001$	N/A*

Note: These two statements were only asked of students who had completed a module

*For this analysis, strongly agree and agree were combined, as was strongly disagree and disagree.

** Only statements where a significant difference was noted between medical and other students are listed in Table 11.

If the module(s) was selected for completion by a lecturer/course coordinator, students indicated that they were significantly more likely to receive encouragement (85.9%, $n = 219$) to complete a module when compared to student who selected modules individually (69.9%, $n = 109$) ($\chi^2 = 15.4$, $p \leq 0.001$).

No significant difference was noted for time to graduate (have graduated, less than one year and other) or, when comparing if the modules were compulsory to non-compulsory, for any of the attitude statements, or the impact on knowledge and confidence.

Qualitative results

Students were also able to provide further comment in regards to the modules. Among the 98 responses, there was positivity towards the modules and a general sense that the modules were appreciated and useful:

'All excellent learning'

'Excellent & very applicable modules. Extremely relevant to my everyday medical practice.'

Students commented that the scenario basis for the modules was also helpful and made the learning more realistic:

'All were well set out and the scenario makes the topic more interesting and easier to relate to real life situations'

'I liked the scenarios and the progression however some parts seemed repetitive and I also couldn't go back to access the patient history again partway through the module.'

'They were much related to the real life situations and all well designed.'

There were some comments in relation to the modules being overly time consuming however:

'Very long modules...some components relevant to pharmacy, some were not'

'Very time consuming and difficult to complete because of the amount of information needed to be entered'

Module's affect on learning and intended behaviour change

In order to gain an understanding of how students' learning was affected as a result of the modules, they were asked to complete the sentence: 'After completing the NPC modules I have learnt...' There were 411 responses with a number of common themes emerging.

Best/appropriate medication to use

'to prescribe with diligence, care, appropriateness and effectiveness.'

'to prescribe appropriately in the future for common clinical conditions. I have had a much better understanding regarding risks and benefits of medications and other options that could potentially be used to manage these conditions.'

Drug dosages

'to always look up drug doses and side-effects before prescribing, and to be aware of costs to the patient.'

'the doses and names of more drugs, all the drugs available, contraindications to certain drugs, where to find good information'

Drug interactions/side effects

'drug-drug interaction how to counsel the patients for some particular drugs'

'about drug indications, contraindications and side effects. I have learned which drug options are best in certain scenarios where there are several choices.'

Best practice/evidence based

'Best practice for prescribing for common problems that I will encounter on the ward.'

'lots of evidence-based information and guidelines relating to common prescribing situations.'

Process of prescribing (including errors)

'There are many things that is prone to error when filling out a prescription'

'the recommended approaches towards pharmacotherapy in various conditions and the proper methods of prescribing.'

What constitutes a prescription/writing a script correctly

'What are the components of a script'

'how to prescribe correctly'

Approach to prescribing

'sound prescribing techniques, in particular for a few common presentations'

'More about how to prescribe, and it made me think about alternatives to drugs.'

Resources

'Other resources I can access to get further information. Also that the best treatment option is a very individual decision for each patient'

'how to access relevant information sources before prescribing a drug. I have a general idea on what to prescribe for different cases'

Non-drug alternatives

'to think more about non drug alternatives to think before prescribing full stop ie. length of intended treatment, side effects, efficacy and cost'

'Pharmacotherapy & non pharmacotherapy approaches & considerations provide the best comprehensive care & outcomes rather than just medications.'

In addition, to gather information on how the modules affect intention to change behaviour, 233 students completed the sentence: 'After completing the NPC modules I intend to....' The leading theme to emerge from these responses was to continue to complete (more/all) of the modules and review the modules for practice (30.4%, n=71).

'Complete more modules after my course has finished as I have found the modules invaluable in gaining greater understanding about the topic covered.'

'revise the topics covered and review anything new I have learned as well as use the method taught to review other medical conditions.'

There were three other themes which were also easily identifiable. As a continuation to the theme mentioned above, continued learning in general was also a noted theme.

'continue building on my learning with regards to safe and appropriate prescribing in addition to building on my own `formulary` of well-known medications'

'continue learning and developing my prescription knowledge and skills'

It was also encouraging that there were a number of students who indicated that they would continue to use NPS resources and seek out further information from NPS.

'continue to use the NPS and have been encouraging others including overseas trained HMO`s new to the health care system to access the website'

'continue using resources such as the NPS further in my learning even as I start my career, as I still have much to learn.'

It was also positive that the application of what has been learnt to practice was another strong theme to emerge.

'take what I've learnt into account for future prescription writing'

'apply this knowledge, and continue to develop it. Ongoing access to the NPS modules will be helpful for this.'

Barriers to completion

Approximately one in five 'completers' (19%, n=78) indicated that they had experienced a barrier completing a module(s). From the remaining students, an additional 6 students also experienced a barrier.

About half (48.6%, n=34) of 70 students also indicated that they were able to overcome this barrier. In order to overcome the barrier four strategies were evident:

Spoke to pharmacist, peer or NPS (n=10)

'asked other students'

'Asked a pharmacist and looked up other resources (e.g. textbooks)'

Found alternate resources (n=3)

'Consulted other sources (some of which were recommended by NPS) such as AMH, MIMS, MJA'

'found alternative resources such as journal articles, websites, textbooks'

Formulary issues/suggestions (n=4)

'Formation of Prescribing drug list'

'found it was quite difficult to pick drugs from a selected list'

IT issues (n=10)

'I used an alternative browser'

'Initially very difficult to access the NPS program – needed to engage the IT helpdesk & load a different search engine on my work computer as the standard one accessible by health staff couldn't load LAMS'

The remaining 36 students (51.6%) were not able to overcome the barrier, however, did provide responses to the question for a suggestion to improve. While not all of the responses were suggestions, the data still provides useful information/feedback.

Ability to go back

'having to go back between the separate windows was frustrating'

'I had a problem going back in the modules. But maybe it was a problem with flash on my laptop.'

Prescribing/formulary

'Filling out some of the prescriptions are hard as the format provided does not always allow for the type of regimen that you want to prescribe. Also some of the expert feedback is not in line with the NPS recommendations'

Compatibility of Mac

'I have a Mac computer which meant it was impossible to go back at all, meaning I had to memorise all patient details to use for the script at the end. You cant use drug if not on formulary- makes it hard to prescribe Rx if pt comes in on a certain Rx'

Other suggestions

'Often you couldn't remember all the patient's history by the time you got to prescribing, and ended up giving the wrong drug because they had a co-morbidity that you'd forgotten about. You needed the history to be visible while doing the prescribing.'

'to do the favourite meds bit and not be able to go back and check I made the right decision'

Suggested topics for modules

Overall, there was a broad range of suggested topics for future modules from 225 students. A number of students indicated 'none' or 'nil' new modules and that the list was already comprehensive. There were however, a number of suggestions however which were repeated by numerous students. These suggestions include;

- Antibiotics
- Asthma
- Community acquired pneumonia/pneumonia
- Fluid/electrolyte imbalance
- Mental health/psychiatry/depression
- Pain management (acute/chronic/post-operative)
- Osteoporosis/arthritis
- Paediatrics
- Renal failure

- Stroke
- Parkinson's Disease

Future resources

There were 181 students who provided suggestions for future resources. Although students are able to click through to relevant sections of Australian clinical references/guidelines/handbooks in the modules, a number of students indicated that direct access would be helpful.

'aus guidelines'

'Easy access to therapeutic guidelines'

'Easy to follow guidelines on what medication to choose in common disease situations'

Students also requested brief summary guides for disease and/or medication.

'Summary guidelines for a wider range of common medical conditions'

'summary pages on medications. iPhone apps that i can look up pharmacological info without requiring the internet to access.'

'Summary statements on Evidence based prescribing in particular conditions'

In addition to brief guides/summaries as outlined above, formulary reference/prescribing guides were also requested to aid in fast decision making at the point of care.

'a generic formulary for us to refer to (or with classes of medications for reference. Eg generations of cephalosporins, class side effects) linked into the web page'

'a prescribing guide for final year medical students'

It is not surprising that there was interest in modules being developed for iPhone and as other smart phone applications.

'PDA application with concise guidelines on pharm and non pharm mgt options/opinions'

'An reasonably priced iPhone flashcard app would be great. Pharmacology information on the iPhone is under represented'

With the addition of the Quality Use of Diagnostics team to NPS, and given the interest among students to see resources specially related to medical tests, it is a consideration for future development.

'Appropriate ordering of medical tests could be quite useful, but may be outside scope of NPS'

indications for medical tests'

Although there are considerable links to articles and guidelines in the modules, there was a strong indication for more journal article links.

'Links to recent key research papers for topics linked to guidelines > 2 years old & for very significant papers regardless of date. Printable 1 page summary of key decision points from each case (to aid quick revision)'

'More articles related to the subject area'

A number of students indicated that more quizzes and tests would be beneficial. This is timely given that future plans to include a quiz at the end of each module to measure knowledge change (addressed further below).

'an online module on investigation test for diseases. an interactive quiz on pharmacodynamics and interactions between commonly prescribed drugs'

'More articles with multiple choice questions to test understanding.'

It is encouraging also that students requested more modules, highlighting the appreciation of the modules to respondents.

'More modules would be great (and the ability to continue accessing them after graduation!).'

'More of such modules'

Attitude toward NPS

Overall, more than three quarters of the 'completers' indicated that NPS is a trusted source of independent, evidence-based information (Table 12). A further 17.2% (n=70) indicated that NPS is a trusted source of information to some extent.

All of the 'starters' indicated that NPS was a trusted source of information (77.7%, n=14) or to some extent (23.3%, n=4).

Table 12: NPS is a trusted source of independent, evidence-based information

(N=407)	% (n)
Yes	77.9 (317)
To some extent	17.2 (70)
Unsure	2.5 (10)
Not aware of NPS as source of information	2.0 (8)
No	0.5 (2)

Additional comments

More than one third (38.4%, n=170) of students provided additional comment. There was an overwhelming positive, congratulatory and appreciative tone in these reflections towards the modules. One third of respondents (33.5%, n=59) provided comments such as:

'A very enjoyable experience'

'An excellent resource, I thoroughly enjoyed using the resource, thank you. It was very helpful. My only (minor) criticism is that the prescription writing is a little confusing and more guidance may be helpful. Thank you very much.'

'make them available to us to review forever please. They are a good reference.'

'Really useful and all med schools should have it- but I wish I had access earlier in my course'

Navigation through the modules and being able to go 'back' was again a common theme among the additional comments.

'Having completed a module, I cannot work my way through the same module again without the clumsy way it runs. This should be changed. I would like to start at the beginning perhaps several times and work through just as it does on the first pass.'

'it would be great if the case can be REPEATED'

Similarly, there were further comments regarding the formulary which had been mentioned previously.

'Great work but it would be even better if there were more options for formatting MyFormulary.'

'the section where you add drugs to your formulary is very non-user friendly, I love the idea of having that resource there but stopped using it after a few cases because it frustrated me and wasted my time'

Although in general students agreed that the expert feedback was useful, there were a number of comments in regards to the expert feedback provided.

'needs to be more comprehensive expert feedback'

'Not all of the expert advice was of the same standard. Some were poorly written and need reviewing. Some questions/answers were quite subjective. Filling in generic script info wasted time. Prescribing nothing should be an option for some cases.'

There were other comments which were more suggestion based:

'Could be improved 1. Confusing questions- correct and incorrect answers subjective 2. Needs to work better on Macs 3. Change the formulary thing, adding drugs was annoying, maybe all should be added and you can put a star next to preferred drug'

'I appreciate the service but would prefer a question bank with detailed explanations for correct and incorrect answers regarding the use of medicines for common conditions. I would appreciate handy tables or flowcharts about preferred medicines.'

There were some negative comments received also.

'I did not complete the module - I did not find that it helped me considerably in my understanding of the area. Through the module I made decisions about medications, and did not receive feedback until the very end - not useful for my learning.'

'I felt that the online prescribing feature in many situations was unrealistic and didn't provide a true experience of prescribing (especially as this was used in assessment at our uni).'

CONCLUSIONS AND RECOMMENDATIONS

The response rate for this survey is greater than any of the previous surveys which have been completed for the NPC. This is most likely due to the mode of delivery (direct from NPS and not through a lecturer/course coordinator), the building of the survey website in-house (not using an external survey builder like Survey Monkey) and also offering 5 randomly drawn prizes. It is also of note that at least one third of responses were received following the reminder email. Future surveys for the NPC should also utilise these techniques.

The responses from the students were very positive and provide assurance to the quality and evidence-based nature of the modules. The responses highlighted the positive impact the modules have on confidence relating to prescribing as well as knowledge, and the feeling of being better prepared to prescribe or recommend the most appropriate option. Similarly, responses in regards to content, instructions, learning objectives, development of critical thinking, and the usefulness of feedback were all very positive.

There were a number of differences noted when comparing medical students and pharmacy students, and also when medical students were compared with all other students. It is not surprising that the strongest difference related to the confidence around prescribing and that the modules were relevant to practice. This is most likely due to medical students being the original target audience of the modules, however, it is also of merit to note that across all four disciplines, there was positive agreement towards all of the statements in relation to the effect of the modules on knowledge and confidence.

Formal assessment of the modules was **not** a highly motivating factor for completion. When this statement was tested between those students where the modules were compulsory and not compulsory, there was no difference. The result may be due to the overall quality of the modules being high but also that the respondents to the survey are the 'converted' and thus placing some bias on the responses seen. The future planning section below indicates an intention to interview some students who are 'non-completers' which may provide results to the contrary in relation to formal assessment.

There was quite an emphasis on the provision of brief summary guides for disease management and prescribing. This is almost certainly an indication of lack of time to sift through all of the available information to find what is most relevant or applicable for that patient within a short time frame. Currently there is no such resource available and as such providing students with summaries at this time will be difficult.

Navigation issues were the most common 'problem' noted by students. In particular the ability to go 'back' within the module was highlighted. Although this may be a localised issue and be potentially related to the users' browser or operating system, some testing may be required to reduce this from happening in the current and future modules. Navigation, IT and usability issues are actively addressed as they arise. In addition, where possible, the team endeavours to assist future learners by providing useful information; for example, the team has strengthened the frequently asked questions to ensure that the confusion arising from the survey (e.g. inability to return to previously completed screens) are clarified. In addition, continual improvements to the navigation and usability have been carried out over the years so it is difficult in some instances to tell whether some of the issues raised are new, or whether it is a previous issue which has already been addressed (e.g. issues raised in regards to the formulary).

Interestingly, there was a high level of awareness of NPS resources among 'other' students and the lack of awareness was in the most part among medical students. This suggests that the profile of NPS resources could be lifted and promoted to a greater extent in the modules, with a particular focus on medical students.

There was a good cross section of responses from 21 different universities being represented (from 25 who offer the modules) and the responses were fairly representative of the student population who are

registered for the NPC. The majority of respondents were either close to course completion or had already completed their course.

Limitations

Although the response rate of the survey was considered to be good, potential bias may also be a consideration. To a certain extent the responses received may be only a representation of students who are content and happy with the service and education the NPC provides.

There may have also been a proportion of students who were not reached by the email as the email address was no longer in use or passwords to access the email account forgotten. A measure of bounce rate was not calculated.

FUTURE PLANNING

In order to have a greater understanding of the impact of the modules on knowledge and learning, there is consideration and discussion to include evaluation questions at the beginning and end of some modules which would be analysed and would provide a measure of the impact of the modules among students.

APPENDIX 1: Student survey

National Prescribing Curriculum 2010 Survey for Students

- 1) Are you
 - Male
 - Female

- 2) What is your postcode of residence?

- 3) University name

- 4) What course are you currently studying?
 - Medicine, please specify clinical school (optional) _____
 - Pharmacy
 - Nurse Practitioner
 - Other, please specify _____

- 5) How many years before you expect to graduate?
 - Have graduated
 - ≤1
 - 2
 - 3
 - 4
 - 5

- 6) How did your lecturer/ course coordinator use the NPC modules in conjunction with your university curriculum? (Mark all that apply):
 - Modules were not compulsory
 - Some/all modules were compulsory
 - Some/all module completion counted towards my course mark
 - Some/all modules were linked to assessment
 - Other, please specify _____

- 7) Did you attempt any of the NPC modules?
 - Yes, started and completed at least one module, please go to Q5
 - Yes, started but did not complete any module, please go to Q5
 - No, did not attempt any module, please explain why (respondents to this option were directed to the survey completion page)

- 8) Which of the following NPC modules have you completed? (Mark all that apply)
 - Mod 1. Chronic obstructive pulmonary disease (COPD)
 - Mod 2. Peptic ulceration with *H. pylori*
 - Mod 3. Peptic ulceration with NSAID use
 - Mod 4. Post-operative pain
 - Mod 5. Narcotic analgesic dependency

- Mod 6. Confusion in an elderly woman
- Mod 7. Confusion associated with alcohol withdrawal
- Mod 8. Acute pulmonary oedema in chronic heart failure
- Mod 9. Chronic heart failure (CHF)
- Mod 10. Urinary tract infection
- Mod 11. Acute coronary syndrome
- Mod 12. Chronic angina after myocardial infarction
- Mod 13. Hypertension in asthma
- Mod 14. Respiratory tract infection in a child
- Mod 15. Generalised seizure
- Mod 16. Polypharmacy in multiple system failure
- Mod 17. Anaemia
- Mod 18. Anticoagulation in atrial fibrillation
- Mod 19. Prophylaxis of deep venous thrombosis
- Mod 20. Adolescent mental health
- Mod 21. Analgesics in persistent pain
- Mod 22. Improving glycaemic control in long-established diabetes
- Mod 23. Long term management of type 2 diabetes – Part 1
- Mod 24. Long term management of type 2 diabetes – Part 2
- Mod 25. Management options to maximise sleep

ANY COMMENTS? _____

9) What other topics would you like to see developed that would be beneficial to your clinical practice?

10) Indicate how modules were selected for completion.

- Self selected
- Chosen by lecturer/ course coordinator
- Recommended by a peer

11) In general, how did you work on the module(s)? (Mark all that apply)

- Individually
- Combination of individual and class work
- Other, please describe _____

12) For the following statements, indicate the extent to which you agree with each of the statements.

	Strongly agree	Agree	Disagree	Strongly disagree
The module tasks were engaging.				
The instructions in the modules were easy to follow.				
The content in the modules was clearly presented.				
The modules are relevant to my (anticipated) clinical experience.				
I would be more motivated to complete the modules if they were formally assessed.				
The module links to other resources were useful.				
The modules have increased my awareness of other NPS resources.				

	Strongly agree	Agree	Disagree	Strongly disagree
The learning objectives were clear.				
The module tasks addressed the learning objectives.				
It was easy to navigate through the modules.				
The module was effective for developing my critical thinking skills (e.g. critical analysis, problem solving).				
The module tasks tested my understanding of the subject area, rather than just my memory.				
Having expert feedback was useful.				
There was adequate feedback in the modules to guide my decision-making process.				
The course co-coordinator/lecturer encouraged me to complete the NPC modules				
Having access to my peers' answers/ideas was useful.				

13) After completing the module(s), indicate the extent to which you agree with each of the statements.

	Strongly agree	Agree	Disagree	Strongly disagree
My knowledge of the therapeutic topic(s) covered in the module(s) has improved.				
My knowledge of the prescribing process has improved.				
I feel more confident in my ability to prescribe/recommend an appropriate therapeutic option.				
I feel better prepared to prescribe/ recommend appropriately.				

14) Please complete the following statements.

After completing the NPC modules:

- a) I have learnt...
- b) I intend to...

(Note: students who had only started a module were not asked this question).

15) Did you experience any barriers when completing the modules?

- Yes, go to Q13a
- No, go to Q14

a. Were you able to find the appropriate help to overcome the barrier(s)?

- Yes, please describe what you did to overcome the barrier(s) (e.g. contacted NPS, asked the lecturer) _____
- No, please suggest how this can be improved _____

16) Do you consider NPS as a trusted source of independent evidence-based information about medicines?

- Yes
- To some extent
- No
- Unsure
- Not aware of NPS as a source of information

17) In the future, what resources would you like NPS to develop or provide to help you in making the better choices about medicines and medical tests?

18) Do you have any additional comments about the NPC modules?

APPENDIX 2

All tables below are a breakdown of medicine and pharmacy students by a number of descriptives. All data has been analysed for the tables below.

	Medicine (N=351) % (n)	Pharmacy (N=62) % (n)
Male	35.9 (126)	27.4 (17)
Female	64.1 (225)	72.6 (45)

State of respondent	Medicine (N=347) % (n)	Pharmacy (N=61) % (n)
NSW	32.6 (113)	8.2 (5)
VIC	25.6 (89)	4.9 (3)
QLD	9.5 (33)	41.0 (25)
TAS	10.7 (37)	39.3 (24)
SA	10.4 (36)	-
WA	9.2 (32)	4.9 (3)
ACT	1.4 (5)	1.6 (1)
NT	0.6 (2)	-

	Medicine (N=351) % (n)	Pharmacy (N=61) % (n)
Have graduated	17.9 (63)	55.7 (34)
<1 Yr	66.1 (232)	41.0 (25)
2	14.8 (52)	1.6 (1)
3	0.9 (3)	1.6 (1)
4	-	-
5	0.3 (1)	-

	Medicine % (n)	Pharmacy % (n)
Modules not compulsory	23.3 (80)	25.8 (16)
Some/all modules compulsory	64.5 (220)	45.8 (27)
Some/all module completion counted to course mark	12.0 (42)	14.5 (9)
Some/all modules linked to assessment	25.1 (88)	35.5 (22)
Other	4.0 (14)	4.8 (3)

	Medicine % (n)	Pharmacy % (n)
Chosen by lecturer/course coordinator	61.3 (211)	72.1 (44)
Self selected	38.4 (132)	27.9 (17)
Recommended by peer	0.3 (1)	-