

# Building rural health care teams through interprofessional simulation-based education

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## Abstract

The Rural Inter-professional Program Emergency Retreat (RIPPER) uses interprofessional learning and simulation together as educational strategies to prepare final year nursing, medical and pharmacy students for effective rural health care delivery. The program provides students with the opportunity to learn and work as a team using authentic and relevant situational learning and skill building. Now in its third year, 31 final year students participated in the 2008 program.

The simulated practice environment provides opportunities for students to develop requisite competencies while learning about health care in rural contexts. In RIPPER, simulation based strategies include role play, low fidelity task trainers, and high fidelity simulation with a computer programmable mannequin. Emergency and community based scenarios specific to the rural context are used as the curriculum for the RIPPER weekend.

Students are required to work collaboratively in small interprofessional teams and apply their different professional skills and knowledge to respond to a variety of emergency situations. Such collaborative models of care reflect actual rural health care practice. By working through issues of disease and injury prevention, immediate acute care and aftercare, students extend their knowledge of holistic rural health service delivery. Learning is facilitated by academics and expert rural health clinicians in a supportive environment as students rotate through the different scenarios and skill stations.

A pre and post test quasi-experimental design was used to evaluate student learning outcomes relating to rural interprofessional practice. Data were collected using a questionnaire comprising attitudinal statements on a 5 point Likert scale, and open ended questions. A mixed methods approach, combining quantitative and qualitative techniques, provided an integrated analysis of the data.

Results show a positive shift in students' understanding of interprofessional practice. Students identified teamwork and collaboration as vital components of maximising rural health care outcomes. They acknowledged that in order to improve clinical outcomes and promote a more satisfied rural health workforce a collaborative clinical culture is required. The evaluation concluded with the students' recognition that in rural practice each discipline does not work in isolation. Each profession plays a significant role in a team that is working towards the delivery of safe and effective rural health care.

The positive evaluation of RIPPER reinforces the need for sustainable and embedded, rigorous, interprofessional rural health education as part of the core undergraduate health science curriculum.

## Introduction

Building current and future health care teams that 'work' for rural areas, the education and training of emerging health professionals continues to be an important workforce strategy in Australia<sup>1</sup>. The shortage of health care professionals and limited resources in rural Australia is unlikely to be alleviated in the short term. As such, there has been a heightened focus on new models of health care collaboration and

practice that not only optimise the quality of patient care but that also increase professional job satisfaction through team based practice. An ideological focus on, and the practical development of interprofessional rural health education has been an increasing response within the university sector over the past thirty years, both internationally and within Australia<sup>2-8</sup>.

This paper discusses the RIPPER initiative (Rural Interprofessional Program Educational Retreat), a simulation enhanced undergraduate rural interprofessional program at the University of Tasmania. The paper describes the teaching methods and activities used for the delivery of RIPPER, and reports on the program evaluations. The evaluations show that student participation in RIPPER resulted in a positive shift in how students' view collaborative practice and teamwork, patient outcomes and professional roles and responsibilities. It concludes with an overview of the key issues impacting on RIPPER and discusses future directions for the use of interprofessional education and simulation to prepare emerging health professionals for effective team-based rural practice.

## Interprofessional rural health education

Within the wider discipline of health and particularly rural health, it is now acknowledged that a 'collaborative team-oriented approach to care is required to ensure patient safety and quality of service delivery'<sup>9</sup>. Interprofessional education (IPE) is defined as "two or more professions learn with, from and about each other to improve collaboration and the quality of care"<sup>3</sup>. It commonly involves education initiatives that incorporate interactive learning methods between different professionals in order to foster collaborative practice. However, it is simultaneously acknowledged that few opportunities exist for emerging health care professionals to learn together interprofessionally in preparation for team based practice<sup>10</sup>. Exposing health science students to effective interprofessional education programs throughout their undergraduate program has been shown to have a number of positive outcomes<sup>3,5,10,12-13</sup>. These include an increase in mutual understanding of the roles and values of other health professionals, raised awareness of the importance of collaborative and team working skills, enhanced communication and improved patient care and outcomes<sup>3,5,10,11-12</sup>. As Robertson and Bandali argue below, the potential benefits of interprofessional health education can have implications for not only individual health practitioners but also their colleagues and ultimately patient care.

The ability for organisations to provide IPE for all healthcare disciplines within a simulated or experimentally controlled environment could help reduce the demands on both the healthcare and education systems and provide students with the necessary knowledge, skills and attitudes to work effectively together once they enter the actual patient care setting<sup>11</sup>.

There is growing national and international evidence that IPE is emerging as a key strategy in undergraduate health science education for improving patient outcomes through building team work skills and collaboration to provide more effective health care services. Nevertheless, it is simultaneously acknowledged that few opportunities exist in many undergraduate nursing, medical and pharmacy programs for students to learn together to prepare for team based practice<sup>10</sup>. This is particularly problematic for rural health because rural practitioners rarely work in isolation, hence the need for an interprofessional rural health education program.

RIPPER uses scenarios that adopt a comprehensive and multidisciplinary approach that enable students to confront and deal with the challenges and innovations of rural health care by developing a shared understanding of economic, sociological, geographical and political issues. Evidence shows that effective interprofessional education programs must reflect the changing nature of health care provision and collaboration, by using interactive and problem based authentic learning environments<sup>3</sup> that promote group work, reflection and mentorship<sup>14</sup>. A critical component of effective interprofessional health

education initiatives is the contextual setting of this education<sup>5,6,15-18</sup>. Drawing upon interprofessional education philosophies and methodologies for rural health education has relevance to the greater national rural health education agenda. As Stone and Smith<sup>6</sup> point out:

... recurring key recommendations from conferences of the NHRA (National Rural Health Alliance) and NRHM (National Undergraduate Rural Health Network) highlight the need for Australian health professional students to have regular opportunities to experience IPE...

Academic and political discourse surrounding the benefits of rural IPE have continued to increase as workforce shortages worsen, health care delivery costs skyrocket, and the implications of a society dealing with chronic disease and an ageing population<sup>19</sup> are being foregrounded. These trends require new ways of training health professionals to work more effectively. The development and implementation of IPE initiatives in the rural context is argued to be increasingly relevant to strengthening future health care teams that 'work' for rural areas because 'in rural areas the shortage of health professionals, limited access to specialist services and a broad case-mix increases the need for collaborative professional practice'<sup>19</sup>. Along with exposing emerging health professionals to the necessity of collaborative practice and expertise, rural IPE is seen to be an effective strategy for exposing students to the nature of rural practice, potentially leading to the future recruitment and retention of health professionals to rural areas<sup>17</sup>. In addition to IPE initiatives, the use of simulation is also becoming a key educational strategy in the training of undergraduate health science students.

## Simulation and rural IPE

The use of simulation in the training of pre-qualification health professionals has increased significantly in recent years<sup>20-26</sup>. Simulation education is defined as 'primarily consisting of case scenarios' that 'replicate authentic clinical encounters'<sup>20</sup>. Simulation as an educational tool can exist in guises including 'low fidelity role playing exercises, the use part task trainers and high fidelity computer driven mannequins'<sup>19</sup> all of which enable the creation of authentic clinical contexts.

Simulation as a means of educating health science students and professionals is increasingly recognised as a natural progression from the once traditional 'apprentice' style of learning and teaching to training based on a safe and flexible learning environment where students can learn and practice skills and experience mistakes prior to interacting with actual patients<sup>20,21</sup>. The obvious advantage of simulation-enhanced education is the opportunity for students 'to learn from error without causing peril to a patient'<sup>23</sup>.

The underlying theme in simulated learning activities is the concept of practice in a 'no risk' environment, providing students an opportunity to build their confidence, apply their knowledge and enhance technical, critical thinking and crisis management skills.<sup>10</sup>

Research findings on simulation identify that students experience increased confidence to practise in clinical areas and they appreciate the opportunity to practice reiteratively without risk to themselves or patients<sup>24</sup>. In addition, there is demonstrated improvement in skill when students are able to practice continuously and with alternative or different scenarios<sup>22</sup>. In other examples, research involving surgical residents report that these residents in 'traditional apprentice groups' did not perform as well as residents in pure simulated groups<sup>25</sup> with similar finding have been found with nursing students<sup>22</sup>. Simulation based education therefore enables students and student teams to reduce future errors and improve patient safety and care. The use of simulation to teach, reinforce and assess self-reflection is relatively new and is seen as a robust model for encouraging reflective practice<sup>23</sup> enabling students to also receive formative feedback<sup>23</sup> from peers and teaching staff.

In recent years, simulation enhanced health education and IPE have been increasingly merged. This is no surprise given that both simulation and IPE as learning strategies commonly include goals of increasing communication, teamwork and leadership skills<sup>11</sup>. The development of education programs based on both interprofessional learning and the use of simulation provide opportunities for students to learn and practice in an authentic safe and risk free environment. It also enables emerging health professionals to train and be prepared for team-based practice and collaboration<sup>11</sup> based on patient safety and refining service delivery skills<sup>9</sup>.

Simulated learning in healthcare enhances students learning, prepares students more fully for the real life clinical environment without risk, and aids in the development of collaboration and communication skills as a result of working as a part of an interdisciplinary team<sup>11</sup>.

Simulation based IPE is therefore seen to be a unique opportunity for students to 'contextualise their learning by integrating both technical and interpersonal skills'<sup>22</sup>. The Rural Inter-Professional Program Emergency Retreat (RIPPER) run by the University of Tasmania is an education initiative that aims to build more effective rural health care teams through interprofessional simulation based education.

## The RIPPER Program

The Rural Interprofessional Program Emergency Retreat (RIPPER) is a pre-qualification pilot IPE program run by the University of Tasmania's Department of Rural Health and Faculty of Health Science. It is now in its third year. The RIPPER program uses interprofessional learning and simulation together as educational strategies to prepare final year nursing, medical and pharmacy students for effective rural health care practice. The objectives of RIPPER are to develop an innovative undergraduate IPE model that uses simulation and IPE to facilitate students' learning and team work within a rural setting. The RIPPER program provides students with the opportunity to learn and work as a team using authentic and relevant situational learning and skill building. Using simulated structured learning scenarios, RIPPER is centred on developing interprofessional teamwork grounded in concepts of adult and experiential learning<sup>9</sup>.

The format and educational design of the RIPPER program was focused on a multi station learning circuit consisting of a number of learning stations using interprofessional case based scenarios. The scenarios stressed key learning's of emergency health care to all disciplines, the nature of emergency in a rural context as well as encouraging a social view of health and illness. Each learning station employed experiential and interactive educational strategies. One station utilised high fidelity simulation (Sim Man) while the others focused on low fidelity simulation and role play. In some scenarios that used role play, professional actors were used to play patients. These actors received coaching and script training from health professionals about how to present the demeanour of a standardised patient<sup>10</sup>.

In running the scenarios, students worked collaboratively in small clinically relevant interprofessional teams that engaged the expertise and knowledge of each profession, with each team consisting of students from nursing, medicine and pharmacy. Each team was required to attend to and interact with the immediate management of the emergency health scenario, to consider strategies for prevention and patient aftercare and ultimately to develop best practice management algorithms. Two iterations of the scenario and simulation were run allowing one group to participate and the other group to observe. Time was provided for peer evaluation, guided reflection and also debriefing with health professional and academic facilitators. In the 2008 program, there were a total of 31 students comprising 10 nursing, 12 medicine and 9 pharmacy students. Similar numbers participated in the previous two years of the program.

## RIPPER evaluation and results

The RIPPER program was evaluated using a questionnaire survey utilising a pre and post test quasi experimental design. The questionnaires were distributed before and after the program. This evaluative approach was used to assist in detecting any changes to students' attitudes and perspectives resulting from their exposure to IPE. The questionnaire was designed using open and closed ended questions to gather both quantitative and qualitative data. According to Ellery (2006) because the outcomes of IPE are 'multidimensional'<sup>9</sup> it lends itself to evaluation that should incorporate a variety of methods<sup>9</sup> 'as a way of obtaining reliable and valid evidence'<sup>9</sup> about IPE.

In evaluating RIPPER, data was gathered to measure students' perceptions of interprofessional learning and practice in the rural context, and the degree to which the aims and learning outcomes of the program were met. This included students' views of collaborative practice and teamwork, their roles and responsibilities in the rural clinical team and benefits to health care practise. The evaluation questionnaire consisted of three components. These included general demographic data (gender, discipline, previous experience living in a rural area), qualitative data using open ended questions on 6 items and quantitative data from 12 items using a five point Likert Scale ranging from strongly agree to strongly disagree. In analysing the evaluation data, SPSS software was used for the quantitative analysis which included assessment of validity and reliability, and the qualitative data was analysed using coding, which categorised the data into relevant themes.

The qualitative questions asked students to define their understanding of interprofessional education and interprofessional practice before and after the program, how RIPPER influenced the way they understood themselves as emerging health professionals and how RIPPER shaped perceptions of other health professionals, if at all. In the post program survey students were asked to list the most useful and least useful aspects of the program and if their learning expectations were met.

The quantitative questions aimed to measure students' attitudes to shared learning and teamwork; perceptions of other health care professionals and understandings of the benefits of collaboration and teamwork. In the pre evaluation quantitative questionnaire most students demonstrated a positive attitude towards team learning and the benefits of collaboration and teamwork with the majority of responses being "agree", however following the post program questionnaire a large number of these responses increased to "strongly agree". The post program results demonstrated a predominantly positive shift in students' understanding of interprofessional practice and its benefits including the roles and skills of other health professions. All post program quantitative questions there was a positive shift in students' responses. The most significant statistical shifts existed under the themes of benefit to patients, learning with other health care professionals to understanding clinical problems and the importance of team work particularly in the rural context.

### Benefits to patients of effective interprofessional practice

The pre and post evaluation responses showed a shift in the value students ascribed to interprofessional practice and the benefits to patients from this collaboration. In response to the statement "patients will ultimately benefit if health care students work together to solve patient problems", 25.8% (n=8) of students agreed and 61.3% (n=19) strongly agreed in the pre test, however in the post test 6.5% (n=2) agreed and 71.1% (n=27) strongly agreed. This positive shift in attitude is supported by a number of statements in response to the open ended qualitative question regarding how the RIPPER program shaped participants perceptions of other health professionals;

"Every role is important and each profession contributes different strengths and if we use these skills effectively and cumulatively, patient outcomes as well as self satisfaction is greatly enhanced" (Medicine).

"Each health professional has their own role and this does really help health professionals in understanding what is going on with patients and improved clinical outcomes" (Pharmacy).

"At the end of the day we all have a common goal" (Medicine).

Students' recognition of the benefits to patients through working collaboratively was also clearly evident in their responses to the open ended question concerning their perceptions of the key features of interprofessional practice. Students' comments included "working together as a team for optimal management of the patient" (pharmacy) "professionals working together, pooling expertise to bring about solutions for the benefit of the patient" (nursing), and "working with other disciplines using your own and their strengths to the benefit of the patient" (medicine).

## Interprofessional learning and clinical problem solving

The pre and post evaluation questionnaire asked students to rate whether they thought that "learning with other health care students increases my ability to understand clinical problems". In the pre program questionnaire 25.8% (n=8) agreed and 58.1% (n=18) strongly agreed; in the post program questionnaire 9.7% (n=3) agreed and 80.6% (n=25) strongly agreed. This shift signifies a twenty per cent increase (n=7) in the number of students who strongly agreed on the benefits of IPL for clinical problem solving. When students were further asked how the RIPPER program had influenced, if at all, their understanding of themselves as emerging health professionals their responses similarly alluded to how IPE helped them to understand clinical problems. The following responses are examples of the link between interprofessional learning and clinical problem solving and management;

It gave me insight into how my interventions are used as a diagnostic tool by the doctor, but it also clarified my role as a nurse and gave me more confidence in my abilities (Nursing).

Team work and communication are important, clinically and diagnostically to manage a problem and how to handle myself in critical situations (Medicine).

I cannot know everything and its OK to seek help (Medicine).

Along with increasing clinical problem solving, students also recognised that interprofessional learning has the capacity to positively improve the way in which they practised interprofessionally in their future careers. In response to the statement "peer learning among health care students could improve working relationships after training", there was a considerable shift in student responses. In the pre evaluation 32.5% (n=10) agreed and 61.3% (n=19) strongly agreed, while in the post evaluation this significantly changed to 6.5% (n=2) agree and 90.3% (n=28) strongly agree, which represents a shift of 29% (n=9). In supporting this shift, the following comments show how the RIPPER program influenced students' perceptions of each other and also their ability to work together positively in the future.

It has introduced me to the challenges others face in hospitals which will help me better communicate in the future (Medicine).

I've really enjoyed working with medical and pharmacy students, and it makes them seem more approachable when I leave here (University) (Nursing.)

It (RIPPER) helped me understand my role in the interprofessional healthcare team, my limitations and strengths and areas I need to improve on, e.g. leadership (Medicine).

## The importance of interprofessional teamwork

A key aim of interprofessional education particularly in the rural context is a 'collaborative team-oriented approach to care'<sup>9</sup>, hence the pre and post evaluations measured how students perceived the importance of team working skills in their training for 'real life practice'. In responding to the statement "team working skills are essential for all healthcare students to learn", there was significant shift in the number of students who strongly agreed, compared with their pre evaluation responses. In the pre program questionnaire 25.8% (n=8) agreed and 64.5% (n=20) strongly agreed, however in the post questionnaire 9.7% (n=3) agreed and 80.6% (n=25) strongly agreed. The following comments by students in the qualitative evaluation questions demonstrated the ways in which students attitudes to teamwork had changed as a result of their participation in the RIPPER program;

I have realised that other health professionals are vital to any health team and that we should use each others' strengths (Medicine).

It reinforced that teams are more effective in providing care due to varying experiences...I am part of a team not just a nurse (Nursing).

...teamwork and communication is a necessity in order to succeed (Medicine).

In respect to collaboration and teamwork in the rural context, **98.8%** (n=30/31) students identified that the RIPPER program had given them a greater understanding of their profession in a health care team approach to rural health issues. The following comment is indicative of this understanding;

RIPPER provided ways of managing patients individually in rural areas, and other things that can be done with the limited resources and facilities in rural areas (Pharmacy).

Additional data was also collected on what students perceived to be the most useful parts of the RIPPER program. Students made the following comments regarding the benefits of the RIPPER program in respect to interprofessional learning, the use of simulation in preparing them for future practise and collaboration;

Being thrown in the deep end to manage critical situations (Medicine)

Working under pressure under situations we may encounter in clinical practice (Medicine)

...Hands on experience, having people (pharmacist, GP's etc) giving their input in real life situations (Nursing).

Getting a first-hand experience on handling acute settings and the mix of a variety of real life common situations (Pharmacy).

The qualitative data analysis showed students who participated in RIPPER recognised that learning and working in a non threatening simulated environment that enabled them to 'learn from their mistakes' and be reflective of their own roles, responsibilities and skills. Many recognised as beneficial to their own learning 'the real life nature' of the scenarios employed in the RIPPER program, acknowledging that the authenticity of these scenarios assisted in not only highlighting the essential nature of teamwork and collaboration, but also prepared them for 'real patients' and their 'not too distant future career'. Other comments from students regarding the value of the RIPPER experience included: increased confidence, increased understanding of each others' roles, importance of the contributions of each health professional's role in the team, importance of helping each other, recognition of the different strengths

each profession could contribute, importance of working in a team for best patient outcomes, recognition of the importance of effective communication, importance of sharing ideas and opinions.

## Discussion

The evaluation demonstrates that RIPPER is an effective model for interprofessional learning and practice<sup>25</sup> in the rural context. The evaluation highlighted that student exposure to rural health issues resulted in an increased awareness of the nature of rural health care provision and the importance of professional collaboration and building of rural health care teams. In light of an under resourced rural workforce, these positive learning experiences relevant to rural practice could enhance the future recruitment and retention of staff.

Despite these important considerations, the value of rural interprofessional health education for students continues to be highlighted. Evaluation data from the RIPPER pilot indicates that the program has been successful in promoting the value and need for undergraduate health science students to learn with and from one another, in a relevant and supportive environment. It is important to note that the evaluation findings acknowledged that the students themselves identified the value and importance of interprofessional learning. For example, students voluntarily provided comments expressing their desire for similar and other interprofessional learning opportunities throughout their undergraduate program.

There is a growing body of literature showcasing the enhancement of IPE through simulation and that simulated learning can improve the education of emerging health professionals<sup>10-11,20-24</sup>. However, it is acknowledged that there is still a need to discover the degree to which knowledge, competence and decision making are transferred from the simulated context to the clinical setting,<sup>11</sup> and particularly the ways in which simulated learning improves patient outcomes. Similarly, it has been noted there is as yet 'only limited evidence of success'<sup>14,15</sup> in measuring the long term effects of interprofessional education on health care practice and patient outcomes.

The continued sustainability of both IPE and simulated enhanced IPE in the rural context needs appropriate and continuing research and evaluation in 'order to validate the degree of knowledge transfer that interprofessional collaboration will provide'<sup>11</sup>. As Robertson and Bandali<sup>11</sup> conclude:

The keys to success in moving from a traditional education model to one embracing IPE and simulation may include the need for a cultural shift, a major investment in capital and curriculum development and most importantly the establishment of strong partnerships and collaborations amongst academic and healthcare institutions.<sup>11</sup>

## Conclusion

The evaluations of the RIPPER 2008 program indicate that students perceived it to be a highly beneficial experience, with many students and staff expressing their desire to participate in more interprofessional learning opportunities throughout their undergraduate curriculum. Participation in the program was the first opportunity for most students to learn interprofessionally in their undergraduate curriculum reinforcing that health professionals 'for the most part are educated in silo's'<sup>11</sup> and further supporting the need for educational strategies such as rural IPE to foster a collaborative team oriented approach to rural health care practice.



## Acknowledgments

The authors would like to acknowledge the team of health professionals and University of Tasmania academics for their commitment to, and involvement in the various aspects of the design, development and implementation of the RIPPER program in rural Tasmania.

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