

**Determining rural learning outcomes for medical student placements
using a consensus process with rural clinical teachers**

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Abstract

Short, longer and programmatic rural attachments have developed in a number of medical programmes around the world. However, there is limited literature on the development of the underpinning learning outcomes to guide these attachments. Rural populations are commonly under-served and the specific needs and challenges of rural health care need to be emphasised, as well as encouraging future practice in these areas. Our aim was to produce common rural-specific learning outcomes, aligned with a rationalisation of existing guiding principles and objectives, for our medical student regional-rural programmes. This was achieved through a Delphi technique involving the relevant clinical teachers and supervisors. Forty-nine consenting participants collectively provided 72 learning outcomes which were synthesised down to 16. A consensus process was used to anonymously rate and then rank to reach consensus for the top four learning outcomes. The learning outcomes were placed within the theoretical framework of a 'pedagogy of place' based on rurality, and triangulated with rural learning outcomes from an Australian study. The four final outcomes were resolved around two areas of 'place'; geographical and developmental. The co-design approach enabled those involved in providing the rural exposure education to generate appropriate learning outcomes.

Keywords

Students, medical; learning outcomes; primary health care; rural clinical placements; Delphi technique; Consensus

Introduction

Background

There is a workforce need to encourage more medical graduates to choose a rural context for their working life. Medical and other health professional programmes have been developing and expanding learning opportunities in rural settings in a number of countries, and some have introduced extensive rural-based medical education programmes to increase the likelihood of subsequent rural practice. Key examples are the Northern Ontario School of Medicine in Canada [1] and the Australian Rural Clinical School programme, which has schools across the country training students in rural and remote locations [2].

Rural New Zealanders have reduced access to many health services and face additional costs in accessing them, with consequent poorer health outcomes [3]. As in many other countries, medical workforce is maldistributed towards urban areas [4] and the rural workforce is fragile and aging [5, 6, 7, 8, 9, 10, 11]. Indigenous Māori are proportionally more likely to live rurally. Rural communities have disproportionate morbidity and a wider income gradient [12]. The most significant health disparities in NZ are those that exist between Māori and non-Māori, regardless of geography, but these disparities may be further exacerbated for rural Māori [13, 14].

The undergraduate medical programme at the University of Auckland has introduced a number of initiatives to increase exposure to rural generalism, with the aim of encouraging students to take up rural careers. In particular, there are three special regional-rural (RR) experiences for selected groups of Year 5 medical students, with a fourth starting in 2020. All students must also spend one year of their programme out of metropolitan Auckland in a regional cohort (Northland, Bay of Plenty, Lakes, Taranaki) or at our urban site in the central North Island (Hamilton).

While the majority of the 290 Year 5 students have a four-week urban general practice placement, these special RR programmes enable 84 students to have an extended time (ranging from 6 to 11 weeks) in rural hospital, general practice and community settings, with an emphasis on learning from undifferentiated patient presentations, and about rurality.

The RR programmes all have shared guiding principles governing their curriculum development and similar key objectives. There are learning outcomes (LOs) that apply to the standard Year 5 general practice attachment, but there were no specific regional-rural LOs (what students should know and be able to do at the end of the attachment), relating to their extended rural exposure. All students undertake the same assessments, regardless of placement location.

Learning outcomes in the literature

Medline was searched to identify studies that have developed and described LOs for medical students on rural placements, using the search terms Learning outcomes.mp AND Education, Medical, Undergraduate/ or undergraduate medical.mp. or Students, Medical/ AND rural.mp. or Rural Health/ or Rural Health Services/ limited to English. Using this strategy, 13 studies were found [15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27]. Of these, four had common LOs for all students who had different pathways delivered at geographically dispersed locations, but these were not described.[21, 23, 24, 26] A further five gave no details of their LOs.[15, 16, 17, 18, 27] Two described their LOs but these were not specific to rural contexts [19, 20].

One study of an eight-week rural clinical rotation in Queensland, Australia, listed 12 LOs, six of which were specifically rural [22]:

1. I gained an appreciation of the greater depth of clinical responsibility inherent in rural practice (responsibility)
2. I gained an understanding of the significance of professional ethics among rural doctors, particularly in relation to confidentiality in the local community (ethics)
3. I observed the diversity of conditions seen in rural practice (diversity)
4. I developed an understanding of inter-professional health care and services in the rural environment (interprofessional)
5. I gained experience in the diagnosis and management of common rural health practice problems (common problems)
6. I increased my knowledge of Indigenous culture and the impact of Indigenous heritage on health (Indigenous).

The final article was a literature review looking at the effectiveness of longitudinal integrated clerkships (LICs), usually in rural locations, which drew on 53 papers [25]. The review aimed to answer eight questions, one of which was ‘What learning outcomes/objectives are defined?’ Not all studies defined specific and explicit learning outcomes, but there was an understanding that these were the same as students undertaking traditional rotations in parallel. For some rotations there were long-term policy outcomes such as encouraging students to practice in rural or remote areas following graduation, but no specific rural LOs were identified in any of the review studies [25].

In addition we found a further study on rural competencies that was validated by a Delphi process [28]. This study suggested 26 core competencies and 158 secondary competencies. These competencies covered a range of domains reflecting isolation, lack of services and the broader scope of practice typified by rural medicine. Competencies differ somewhat to LOs in that competencies are defined as the desired knowledge and skills, whereas LOs are specific statements that define what a student will be able to do in a measurable way [29].

A key objective is a general statement about the larger goals of a programme, and competency involves a general statement detailing the desired knowledge and skills of the subsequent graduating students [30].

Theoretical framework

LOs can serve as guidelines for managing learning and teaching, and may also be the basis of assessing that the student has mastered the expected skills or knowledge [31]. In a learner-centred approach, students need to be active participants who want to learn and manage their own learning, so that while assessments such as assignments or examinations need to align to LOs, a course or programme can also specify LOs against which students may judge themselves [29].

In a paper on pedagogy for rural health, Reid describes a conceptual and theoretical basis for the education of medical students in rural health as having both geographical

(journey away from the known and secure; immersion experience: shifting the context of learning; simpler, less crowded systems; defined, bounded communities; cooperative social interaction) and developmental (social determinants of health in the context of globalisation; understanding and dealing with poverty; social justice and responses to inequity; health as part of development; the relationship of “social capital” to health) features [32]. In place-based learning, the community context is an important factor in the outcome of learning. Also important are the issues of equity and justice, with rural populations having less resources and access to services, and living in greater poverty, than their urban counter-parts. This theoretical framework enables placement of rural LOs in a ‘pedagogy of place’, based on rurality.

Rationale

Learning outcomes are focused on the learner rather than the teacher, although they guide both. They address the learning resulting from the activity rather than the activity itself. Students’ learning will be enhanced if they are informed at the start about what they will be expected to know/learn, and what they may be able to do/know/apply by the end of their programme. LOs are about achieving specific knowledge, skills and attitudes through the learning experience. It is important that the RR programmes have clear, consistent and aligned guiding principles, key objectives and rural-specific LOs. It also seems appropriate that consensus regarding these is obtained from the clinical teachers providing the training and supervision of the students.

Aim

Our aim therefore was to produce common guiding principles and key objectives with aligned rural-specific LOs for the RR programmes through a consensus process involving the relevant clinical teachers and supervisors.

Methods

Design

The programme's existing guiding principles and key objectives for the three current RR programmes were compared, and a common set developed that incorporated all components.

A co-design approach was used with mixed methodology to develop the LOs. In line with the principles of co-design [33], this initiative was designed to enable the end-users, those involved in providing the rural exposure experience, to determine the expected LOs [34, 35]. A modified three-round Delphi technique was implemented with a panel of key informants, with the first round used to generate the learning outcomes and the next two rounds for anonymous prioritisation and getting consensus. This was an iterative technique in which sequential surveys were answered anonymously by a range of relevant experts, with summarised feedback to enable reaching consensus [36]. Participants were given around two weeks to respond at each round.

To increase the validity of the data, through cross-verification, the six rural undergraduate medical programme LOs identified in the literature review [22] were triangulated with the list generated by the panellists.

Participants

An anonymous panel of key informants was established to generate proposed LOs using the online survey platform Qualtrics [37]. Participants invited to be members of the Delphi panel were all the clinical teachers and supervisors of medical students in the three existing and the one proposed RR programme – rural hospital doctors, rural GPs, and regionally-sited academic coordinators of the programmes. These included both key educators in the programme and also others who provided supervision on limited occasions.

Research processes

In Round 1 (pre-Delphi round), the participants were asked to suggest up to ten LOs pertaining to the rural exposure component of the programme. They were supplied with the following list of action verbs extracted from Bloom's taxonomy to assist them in indicating explicitly what the student must be able to do to demonstrate the learning [38]:

- Knowledge: define, list, name, order, recognise, recall, label
- Comprehension: classify, describe, discuss, explain, identify, locate, report, review
- Application: apply, choose, demonstrate, illustrate, practice, solve, use
- Analysis: analyse, appraise, calculate, compare/contrast, differentiate, diagram
- Synthesis: arrange, assemble, construct, design, formulate, prepare, write
- Evaluation: assess, argue, judge, predict, rate, evaluate, score, choose.

Suggestions generated by the panellists were collated. Using a general inductive thematic approach [39], themes and sub-themes were agreed upon and coded by all three researchers, and also matched with MBChB programme domains (the curriculum is formed under five domains). Data were then sorted by codes, collapsed, and synthesised to a list of key LOs. Agreement between researchers was reached by consensus. Where there were similar suggestions from a number of participants, these were combined into representative LOs for Round 2.

In Round 2, the panellists were invited to rate each LO on a four-point Likert scale for level of importance (1 being the most important). Their responses were used to calculate agreement indicated by mean score, where a smaller mean demonstrates more agreement. Collated responses were ordered in degree of importance and the top eight selected for Round 3.

In Round 3, panellists were asked to rank the LOs by dragging and dropping them into order of importance. This ranking determined the priority of the LOs generated by the group. The top four were selected as the primary LO for the programme. Finally, a set of guiding principles, key objectives and LOs was produced that is common to all RR programmes.

Ethical considerations

Ethical approval was obtained from the University of Auckland Human Participants Ethics Committee (Ref 022917). The participant information sheet was included in the survey, and response to the online questions was considered to be informed consent. The Delphi rounds were anonymous and complete confidentiality of participants was maintained.

Results

Guiding principles and key objectives

Six common guiding principles were identified: programme equivalence (including assessments), explicit curriculum, workload containment, curriculum flexibility, curriculum sustainability and transferability, and continuity of attachment (Table 1).

There are six common key objectives: learn in regional-rural settings, learn from undifferentiated patients, provide a diverse learning experiences, experience more continuity of care, gain a rich experiences in rural community, and appreciate interprofessional cooperation (Table 2).

Participants in panel

The invitation was sent to 49 potential participants, consisting of doctors with dual fellowships (rural hospital doctor and GP), rural hospital doctors, GPs, and other academics or professional staff involved in coordinating and / or teaching one of the programmes. The same group were invited to participate in round 2 and round 3, regardless of whether they had engaged in the previous round(s). There were 15 participants (31% of potential participants) in round 1, 13 (27%) in round 2, and 17 (35%) in round 3 (Table 3).

Delphi round results

Round 1 generated 72 learning outcomes which were collated, matched to a programme domain, and categorised as either rural-specific or generic. Broad themes were identified: procedural skills, rural inequities / social determinants of health; how services meet rural community needs, and scope of rural practice.

A final list of 16 LOs to be ranked in Round 2 was produced (see Supplementary material Table 1). One related to the applied science for medicine; one to personal and professional skills; four to clinical and communication skills; three to Hauora Māori (Māori health), and eight to the population health domain. The eight top rated LOs from Round 2 were presented for ranking in Round 3 (see supplementary material Table 2).

The four final LO are (Table 4):

1. Recognise the breadth of presentations in comprehensive rural generalist care (applied science for medicine domain).
2. Recognise the challenges presented by geography, distance, and local resources in managing patients in rural NZ (population health domain).
3. Describe barriers to health care for rural Māori (Hauora Māori domain).
4. Identify the roles of the rural doctor which go beyond being the “medical expert,” including advocate, communicator, collaborator, leader, professional and community member (personal and professional skills domain).

Finally, our results were triangulated with the six rural learning outcomes from Moffatt et al [22] – Table 5.

Discussion

In this study, we identified four core regional-rural (RR) learning outcomes for medical students’ attachments, using a modified Delphi technique. These aligned well with rural LOs developed for other similar settings. They will provide a consistent framework for the four RR experiences in our programme and should be of value to other institutions who offer similar experiences.

Although the four RR programmes differ in composition of rural hospital medicine, rural general practice and community placements, and in duration (six to 11 weeks), these four LO assist in students focusing on the key features of rurality – the breadth of presentations, additional challenges in providing health care, added care delivery barriers for rural Māori, and the multiple roles of rural doctors hold in their communities. They serve to direct students and enable them to self-assess that they have achieved the expected learnings and experiences at the completion of the attachment.

Relating to existing literature

While there was no requirement for the LOs to belong to the different curriculum domains, the final four LO identified, that are now adopted for the Year 5 RR programmes, match with four of the five domains (applied science for medicine; population health; Hauora Māori, and personal and professional skills). Many of the proposed LOs that matched to the clinical and communication skills domain were generic in nature and covered by existing LOs and graduate outcomes. When triangulated with rural LOs identified from the literature, three of the four matched with the rural LOs provided in Moffatt et al's study (Table 5) [22]. However the latter did not include a LO regarding the geographical challenges associated with rurality.

In regard to the theoretical framework of a 'pedagogy of place' based on rurality [32], the first two LOs fit with geographical features (breadth of presentations in rural generalism, and challenges presented by geography, distance and resourcing), whereas the last two have developmental features (barriers for rural Māori, and holistic role of rural practitioner). It was important that the final LOs were grounded in rurality to provide distinctiveness and a clear sense of place.

This is only the second published study to explore the particular features of a rural attachment in providing specific learning outcomes for medical students [22]. In comparison to the other existing study, geographical factors, which would seem central to a rural placement, came through strongly in our LOs.

A number of programmes, in a variety of disciplines including pharmacy, nurse practitioners, palliative care and child and adolescent psychiatry, have used a modified Delphi technique to gain consensus on student learning outcomes [40, 41, 42, 43, 44, 45, 46]. In addition, Gouveia et al have developed a framework of competencies [28]. However, we were unaware of any studies that have specifically looked at LOs for medical student rural placements.

Strengths

A strength of this study is the co-design approach, enabling those involved in providing the rural exposure education to generate appropriate learning outcomes and priority rate and rank them. The use of the anonymised Delphi technique means that the determination of the final LOs was consensual in nature, and decided by the end-users themselves.

The study has resulted in a set of common guiding principles, key objectives and rural-specific LOs for use in all RR programmes.

Limitations

There was a low response rate for all three rounds, ranging from 27% to 35%. However, given the slightly different mix of professional types, more than a third of the sample will have contributed to at least one round, increasing the diversity of input.

Furthermore, we were very inclusive and eclectic in whom we invited to participate, and a number of people on our list did not have a major teaching role in our programme.

Had we only selected key educators, it is likely that our response rate would have been much higher.

Conclusion

In conclusion, we developed specific rural LOs that relate both to geography and to the development of the rural clinician. Undergraduate rural programmes need to develop specific LOs, as generic general practice (or other specialty) LOs will not capture the

complexity, challenges and different roles of rural clinicians. Those working on the ground are best placed to determine these.

While our task was very specific to our programme, the co-design approach we used is transferable to many other contexts. Getting all relevant end-users to generate ideas, collating and synthesising these and then reaching consensus using anonymous Delphi rating and making techniques, means the stakeholders (in our case, the community-based clinical teachers) have a sense of engagement with, and ownership of, the outcome.

Funding

The work was not supported by any funding grant.

Disclosure statement

The authors report no conflicts of interest.

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