Physician-Teacher Perceptions of Undergraduate Medical Students' Four-week Integrated Community Experience

by

Marsha Ann Reinikka

A thesis submitted in partial fulfillment of the requirements for the degree of

Master of Education

FACULTY OF EDUCATION

LAKEHEAD UNIVERSITY

THUNDER BAY, ONTARIO

April 2008

Your file Votre référence
ISBN: 978-0-494-43407-9
Our file Notre référence
ISBN: 978-0-494-43407-9

ACKNOWLEDGEMENTS

This project benefited from many contributions made by members of the Faculty of Education at Lakehead University and the Northern Ontario School of Medicine. In developing the plan for this thesis I received support and help from dedicated professionals who spent time and energy to provide thoughtful guidance and advice on the project planning, the text and revisions.

I want to thank the members of my committee, Dr. Christina van Barneveld, Dr. Kathy Black, and Dr. Jay Shores for their inspiration and expertise in the area of medical education. Their time and energy is gratefully acknowledged; this project would not have gone forward without their hard work. Christina was never-failing in her dedication and commitment to see that this project would be done to a high standard. Her support extended outside of the realm of editing and ideas, to employer and advisor. Her assignment of tasks stretched me toward a better informed and more positive professional attitude that will continue to serve me in the future. She always encouraged me in my work and her confidence was continually demonstrated. Kathy had a positive attitude and clear insight into how to make this project more meaningful to all the stakeholders. Jay was ever-ready with his time and attention to give ideas that helped steer me to a better understanding of research in medical education.

At the Northern Ontario School of Medicine, Dr. Joel Lanphear was of great help with his understanding of the northern physicians and his on-going help with editing and planning. Dr. Strasser, Founding Dean, provided his expert guidance to set the project up in a workable and useful way.

Thank you also to everyone who believed in my abilities and supported me on this journey, particularly my friend Patricia McGowan who gave her time to edit the final draft of this work. My family and friends were encouraging and positive as I worked toward the completion of this goal.

ABSTRACT

The purpose of this study was to examine the perceptions of Northern Ontario physician-teachers with regard to second-year medical students who participated in a Northern Ontario School of Medicine (NOSM) four-week integrated community experience. A questionnaire, with follow-up interviews, was given to the physician-teachers to determine their perception of the impact of the NOSM students on the physician-teacher's medical practice, the participation of the students in the community, and the student performance on selected areas of the curriculum. Physician-teachers reported that the students had a small negative impact on the productivity of their practice and a positive impact on the professional aspects of their practice. The physician-teachers perceived that the second-year NOSM students participated in the community as much or more than third- and fourth-year elective students from other medical schools. The physician-teachers reported that the performance of the NOSM second-year students on selected areas of the curriculum was as good, if not better, than third- and fourth-year students on elective placements from other medical schools. Implications of results are discussed in reference to the key stakeholders.

TABLE OF CONTENTS

LIST OF FIGURES

INTRODUCTION

Statement of the Problem

Rural medical education programs have been created to address the shortage of practicing doctors in rural areas (Curran & Rourke, 2004; Rabinowitz, Diamond, Markham & Paynter, 2007). A key component of rural medical education programs is the provision of rural community experiences for the medical students. These community experiences depend on rural physician-teachers who are willing to assume the responsibility of training medical students. Recruitment of physician-teachers is important to the success of rural community experiences for medical students. The level of recruitment may depend, in part, on the physician-teachers perceptions of the impact of medical student placements on the physician-teacher's medical practice. Other considerations that may effect physician-teacher recruitment may be the physician-teachers' perceptions of the students' participation in the community and the students' performance while on placement. If rural physician-teachers do not perceive hosting medical students as a positive experience, rural medicine programs may have trouble recruiting and retaining physician-teachers.

Purpose of the Study

The purpose of this study was to describe physician-teacher perceptions of second-year NOSM students. The study was done following a 4-week integrated rural community experience. There were three foci of the study. The first focus was the impact of the students on physician-teacher practice. The second focus was the student participation and experience in the community.

The final focus was the performance of the students on areas related to the curriculum.

Research Questions

The three research questions addressed in this study were:

RQ1 What do physician-teachers describe as the impact of the second-year NOSM student(s) during a 4-week integrated rural community experience on physician-teacher practice?

RQ2 What do physician-teachers describe as community participation of second-year NOSM students during a 4-week integrated rural community experience?

RQ3 What do physician-teachers describe as the performance of the second-year NOSM students during a four-week integrated rural community experience on selected areas related to the curriculum of the NOSM?

Physician-teachers were asked to share their perceptions of second-year NOSM students following the 4-week student placement in November 2007. Physician-teachers with prior experience as a physician-teacher also were asked to compare the NOSM students who were recently placed with them to previous medical learners they had supervised. Experience with third- and fourth-year elective medical students from other schools was necessary before physician-teachers could make comparisons between that group and the NOSM students.

Definition of Terms

Integrated community experience refers to the experience of both medical and community-based learning, including the placement of undergraduate medical students with physician-teachers, who accept responsibility for the student(s) during their placement. The placement portion is concurrently supported by distance learning from the medical school.

Physician-teachers are clinicians who take on the responsibility of training medical students in the community. The term physician-teacher defines clearly the role of the preceptor as educator and is becoming more commonly used (Ashar, Levine, Magaziner, Shochet, & Wright, 2007).

Rural in this study refers to communities in metropolitan-influenced zones (Statistics Canada, 2007) in Northern Ontario which lie outside of Sudbury and Thunder Bay. Rural sites which hosted NOSM undergraduate medical students for the four-week rural integrated community experience during year two of the undergraduate medical school program ranged in population from 5,000 to 7,500.

REVIEW OF LITERATURE

This review of research literature related to rural medical education includes a review of scholarly work on: 1) student impact on physician-teacher practice, 2) student participation in the community, and 3) field-based student performance in areas related to the curriculum. Scholarly journal articles, from 1996 – 2007, focusing on clinical clerkship in a rural setting were collected by a variety of methods. In addition to searching the leading scholarly journals in medical education, such as Academic Medicine, Medical Education, Teaching and Learning in Medicine and searching journal indexes such as Publine, and Medline, the literature search was extended by a snow ball search of the bibliographies of all relevant articles. The topics and methods in the articles were used to inform the theoretical framework, and methods-related decisions for this thesis.

Pre-existing theoretical frameworks are presented as they relate to the three areas. These frameworks have informed the research questions and will be used to interpret the results. The final topic in this section of the thesis is a brief description of the context of the study: the undergraduate medical program at the Northern Ontario School of Medicine.

Rural Medical Education

Over the last 20 years, governments, including those of the United States, Canada, and Australia, have funded efforts to produce more generalist rural physicians for practice in areas that have either been historically underserved or have seen a steady decline of medical services (Geyman, Hart, Norris, Coombs,

& Lishner, 2000). Strategies created to increase the number of rural physicians include the development of new programs (including new rural integrated community experiences), new medical schools (e.g. the Northern Ontario School of Medicine; Mercer University, Georgia; James Cook University, Queensland), and the expansion of existing programs (Geyman et al.).

Literature on rural undergraduate community experiences tends to focus on four main themes: 1) the program itself or the curriculum being offered, 2) learner outcomes (i.e., how students exhibit different capacities during and after their rural placement), 3) career results (i.e., the impact of rural experiences on the number of rural doctors), and 4) issues related to physician-teachers (Reinikka, van Barneveld, & Shores, 2007). This study extends the work done by Worley & Kitto (2001) and Barritt, Silagy, Worley, Watts, Marley & Gill (1997) who explored issues related to physician-teachers in rural contexts.

Since physicians are graduating and meeting certification requirements from rural programs with integrated community experiences (Halaas, 2005), these types of programs are a feasible alternative to the traditional model where student placements tend to take place in a tertiary healthcare setting. The provision of integrated community experiences depends on physician-teachers who are willing to assume the responsibility of training medical students within their practices. However, the demand for physician-teachers may exceed the supply (Grayson, Klein, Lugo, & Visintainer, 1998). The main reason rural physician-teachers take students on is to encourage the students to practice in their rural community, but physician-teachers may also be energized and stimulated by the inclusion of medical students in their practice (Rourke, J., 2008).

Student Impact on Physician-teacher Practice

Physician-teachers are volunteer, part-time physician faculty who primarily practice in non-university clinical sites (Walling, Sutton, & Gold, 2001). Physician-teachers contribute to medical students' education by teaching, supervising in clinics, or contributing to teaching sessions. Walling et al. describe administrative agreements between U.S. medical schools and community physician-teachers regarding arrangements for academic appointment, review, and promotion. Recognizing physician-teachers as a unique faculty group is an active area of development in faculty affairs policy (Walling et al., 2001).

Research shows that medical student placements in rural communities have both benefits and drawbacks for physician-teachers. Benefits of new and expanded rural student placements include opportunities for community-based physicians to enhance their professional satisfaction, personal satisfaction, and continuing education (Norris, Coombs, House, Moore, Wenrich, & Ramsey, 2006). These non-monetary benefits appear to be strong motivators for community physician-teachers (Grayson et al., 1998).

The drawbacks of medical student placements for physician-teachers are associated with productivity, although research has yielded mixed results (Grayson et al., 1998). In Grayson et al.'s 1998 study, two-thirds of 158 physician-teachers surveyed reported that costs associated with their practice productivity remained unchanged, while one-third noted costs were higher and productivity was reduced when medical students were on placement. Physician-teachers in Grayson's study did not receive monetary remuneration, although they did receive faculty appointments; placements consisted of ten 3-hour

placements in first year and sixteen 3-hour placements in second year. In another study, no significant negative economic impact was reported for a six-week undergraduate student placement in a rural primary care practice (Fields, Toffler, & Bledsoe, 1994). In Fields et al.'s study a questionnaire was completed by twenty-three physician-teachers. The factors that may have accounted for a lack of negative impact on productivity included the self-directed method of learning the students used, faculty-developed strategies to minimize negative student impact, extended work days, and that students took over some of the patient care responsibilities.

Norris et al. administered a survey to rural physician-teachers in 2000 and again in 2005 to determine the impact of medical students on physician-teacher practice. They found that physicians perceived students that had a slightly positive impact on the professional aspects of their practice and a slightly negative impact on the productivity aspects of their practice. In Northern Ontario, 400 physicians were surveyed to determine the physicians' expectations of medical students from NOSM (Hunt, Zmijowskyj, Decker, & Reinikka, 2007). Hunt et al.'s work was based on the questionnaire done by Norris et al. (2006). The results of the survey of Northern Ontario physicians had findings similar to those of Norris et al., although the physicians were more than twice as negative about the possible impact on both the productivity and professional aspects of practice. The physician-teacher expectations were based on their previous experience with third- and fourth-year undergraduate medical students and residency community placements from other medical schools.

Physician-teachers have indicated that they want to be recognized for their work by financial reimbursement, quality assurance points, or 'academic

status' with the university (Barritt et al., 1997). While 94% of rural physicians involved in short-term rural clinical placements of two-to-eight weeks in length were willing to take on medical students and 81% reported a positive impact of medical students on their professional development, 53% reported a negative impact on their income. These results were consistent with results reported by Norris et al. (2006) on Northwestern United States physician-teachers.

Two theoretical frameworks were used in relation to the first research question of this study which addressed the physician-teachers perception of the student impact on physician-teacher practice. The theoretical frameworks were Worley & Kitto's (2001) model regarding the impact of students on productivity aspects of physician-teacher practice and Grayson et al.'s (1998) theory as it relates to the impact of medical students on the professional aspects of physician-teacher practice.

Worley & Kitto proposed a model that related the impact of student attachments to rural general practice productivity. Worley's results were based on clinical logbooks of seven physician-teachers and four volunteer students, as well as direct observation of 932 patient consultations. Their model suggests that physician-teachers who have undergraduate medical students placed with them initially experience a negative financial impact due to time taken from their practice and spent with the students. At a point between four weeks to five months (when they first collected data), the students become a financial benefit. They proposed the concept of a 'break-even point', defined as the length of time necessary for the financial benefit to equal the earlier loss. Based on this model, I expected that the four-week placement would create a negative physician-

teacher perception of the impact of the NOSM 2007 rural integrated community experience on their practice productivity.

Grayson et al. (1998) theorized that if physicians teach medical students, physician-teachers will perceive increases in job satisfaction, professional growth, professional stature, and patient satisfaction. Based on Grayson's work, I expected physician-teachers in this study would report a positive impact on the professional aspects of their practice.

Student Participation and Experience in the Community

Kataoka-Yahiro, Cohen, Yoder, and Canham, (1998). developed a model for learning-service community partnership between a school of nursing and a community. The model is illustrated by a dyadic picture, with the school on one side and the community on the other. (See Figure 1, below). The school had a need for a learning environment and the ability to provide services, while the community had a need for service and the ability to provide a learning environment. The two sides are connected in a mutually reciprocal relationship that involves all stakeholders and depends on social interaction and relationship building. The stakeholders in the school include students, faculty, and administration. The stakeholders in the community include clients, staff, and administrators. The model illustrates that a common goal and a shared vision of all the stakeholders impacts the success of the partnership. Their model was based on a nursing school that worked with a specific community agency in a rural environment. During the rural placement, students provided a vision-screening program for 200 pre-school children. Student acceptance of the

learning-service model is contingent on the faculty having a positive response to the program. Based on Kataoke-Yahiro et al.'s theoretical model, I expected that the Northern Ontario School of Medicine and the rural communities will have a similar learning-service partnership.

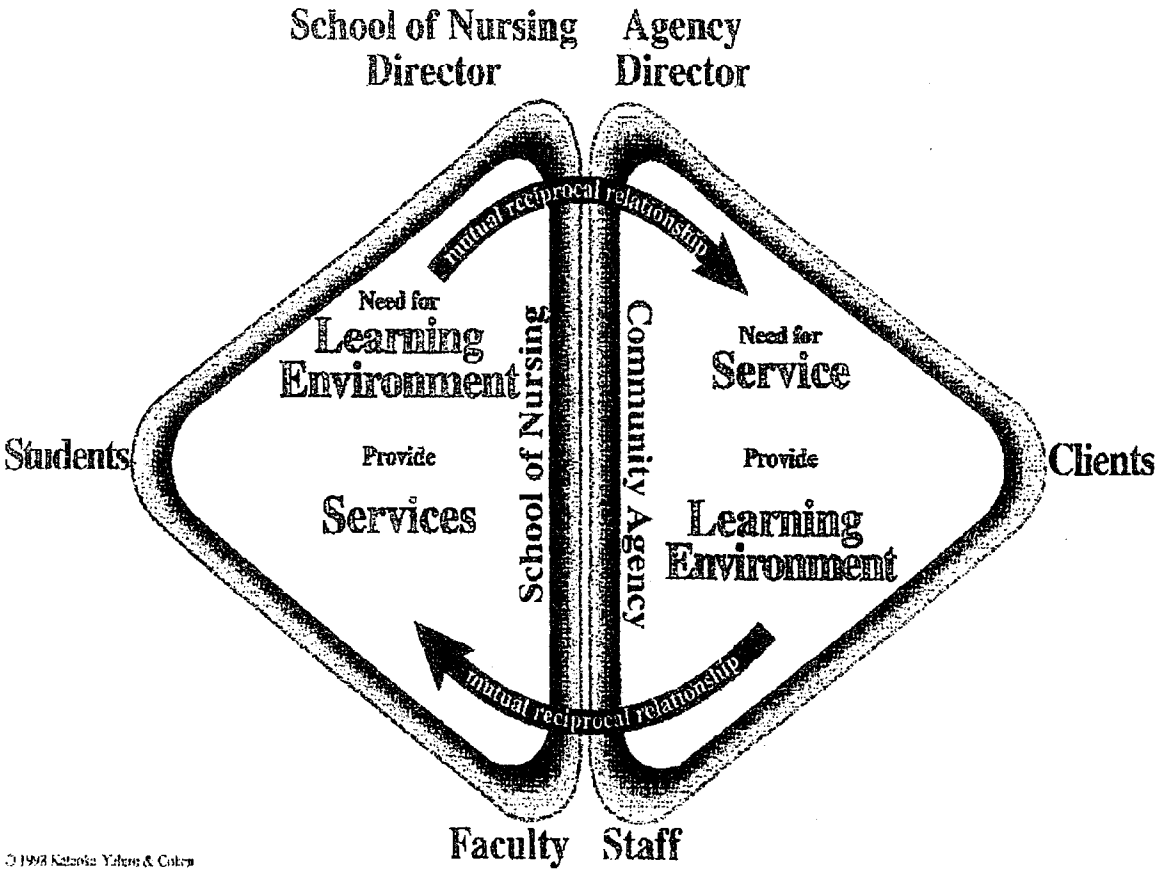


Figure 1: School-Community Partnership Model, (Kataoka et al., 1998)

Bauch's (2000) model of school-community partnerships reiterates the need for social interactions and relationship building. Bauch defines a school-community partnership model as built on "social interactions, mutual trust and

relationships that promote agency within the community for the development of the common good" (p. 208). Bauch identified the need for constructivist leadership that considers the views of others, welcomes diverse thinking, and is not driven by institutional constraints. Connections between the students and the community are necessary for a positive school-community partnership. These connections include;

- social capital, which includes participation in networks, reciprocity, and trust;
- a sense of place, which includes an awareness of the wholeness of the community and a sense of belonging; and
- the use of the community as a curricular resource, where the community connections provide educational resources outside the health centres.

Situations where students participate and interact with the community in social and cultural contexts build the connections needed for a school-community partnership. In this study, I expected that the physician-teachers would perceive an increase in community participation by the NOSM students. Based on Bauch's theoretical model, increased participation would provide increased opportunities for building the connections necessary for community-school partnership.

One example of the learning-service model in action, between a medical school and a rural community, was studied in South Africa (Williams, Reid, Myeni, Pitt, & Solarsh, 1999). Williams et al. used a mixed-methods study that included questionnaires for students and staff following a rural community

placement of 114 fourth-year medical students. Results of the study suggest that the rural placement was a positive learning experience for the students and there was a community benefit that included a social health program created during the placement. This community-involvement study was done at a single school in South Africa and the results may be unique to the context of the study.

In the current study, relationship building between students and the community is considered. Based on previous experience with elective students from other schools, the physician-teachers had expectations of the community participation of the NOSM students, However, the students have been chosen, trained, and encouraged to engage with the local communities and to develop relationships. Therefore, I expected that, the physician-teachers' perception of the students in the NOSM integrated community experience would be more positive than the physician-teachers expectations, particularly in social interactions and relationship building.

Student Performance on Areas Related to the Curriculum

Benefits of rural experiences for students include:

- having an excellent environment for generalist training,
- easily identified community health impacts,
- more opportunities for intervention,
- accessibility of both the primary and secondary healthcare sectors, and
- increased access to caseloads and hands-on experience (Worley, Prideaux, Strasser, Silagy, & Magarey, 2000).

Students enjoy the rural experience, where they are valued for their skills and experience (Smucny, Beatty, Grant, Dennison, & Wolff, 2005). Other benefits of rural experiences for medical students include positive student performance and an increase in the number of rural physicians. Researchers reported that students in rural placements had a high level of competence on procedural skills and academic performance with an increased level of clinical confidence (Worely, Silagy, Prideaux, Newble, & Jones, 2000). Rural clinical experiences have been shown to positively influence many medical students' reported intentions to practice in a rural setting and have increased their interest in rural health (Critchley, DeWitt, Khan, & Liaw, 2007). However, the results of rural community experience on career placement are varied, and more research is necessary to determine how the type and length of community experiences in rural settings impact the number of rural doctors.

Students expressed concerns with regard to rural community experience (Jones, DeWitt, & Cross, 2007). The students' concerns include:

- the quality of teaching,
- the difficulty of arranging transportation,
- location issues,
- a negative impact on students' ability to obtain preferred internship,
- family issues, and
- the lack of incentives.

Darling-Hammond (2000, p.166) found evidence that "integrated programs with extended clinical preparation interwoven with course work" produce professionals who are "both more effective and more likely to enter and stay" in the profession. Darling-Hammond's findings support Dewey's (1929) educational

theory that "knowledge and understanding render [the teacher's] practice more intelligent, more flexible, and better adapted to deal effectively with concrete phenomena of practice" (Dewey, p.20). Based on this theory of knowledge production, I expect that the northern and rural health curriculum, as provided by NOSM, will have a positive impact the performance of students on areas related to northern and rural health.

Context of the Study: Northern Ontario School of Medicine

The Northern Ontario School of Medicine (NOSM) is a new medical school focused on training new physicians for practice in northern and rural environments. The distinctiveness of the NOSM program is based on: an admissions policy geared toward students with rural backgrounds, a curriculum with a northern and rural health focus, a self-directed learning model, and an early and diverse range of rural experiences for students (NOSM, 2007).

The curriculum at NOSM consists of five themes that are integrated and assessed throughout the student learning experiences (Northern Ontario School of Medicine, 2007). The traditional themes taught at all medical schools are Foundations of Medicine and Clinical Skills in Health Care. The two themes, Personal and Professional Aspects of Medical Practice and Social and Population Health, although addressed separately in the NOSM curriculum, may have aspects woven into the curriculum at other medical schools. The theme unique to the NOSM is Northern and Rural Health.

The Northern and Rural Health curriculum is intended to develop a knowledge base concerning rural and Northern health care in Ontario and to

prepare students for the isolation of the rural context. Students can use this knowledge to demonstrate understanding and responsiveness to the needs of the Aboriginal and Francophone communities and the peoples of the North. The curriculum uses patient-centred and community-centred health-care foci that include scheduled interprofessional experiences. The 'patient-centred' aspect involves patients planning their health care and encourages them to take responsibility for their own health care (Lowes, 1998). Health Canada promotes patient-centred practice as a component of the Pan-Canadian Health Human Resources Strategy (Health Canada, 2007). A patient-centred approach to health care contributes to improved health care, access to health care, recruitment and retention of health care providers, patient safety, and satisfaction of both patients and health care providers (Health Canada, 2008). A community-centred approach reflects the needs of the community and the people they serve (Romanow, 2002). It is a necessary component for health care in rural and aboriginal communities. Patient- and community-centred approaches to health care are especially necessary for an understanding of the Northern and Rural Health curriculum.

Interprofessional health care is one of the necessary features of a small community with limited health care professionals. Interprofessional educational initiatives are a means to engage health care professionals in collaborative patient-centred care (Whitehead, 2007). Interprofessional education includes learning experiences with, from, and about other health professionals. These strategies are being developed and promoted by the National Expert Committee of Health Canada (Health Canada, 2008). Interprofessional teamwork can

facilitate more effective and efficient patient care, encourage professional growth and job satisfaction, provide economy in health care costs by eliminating duplication and delays, and provide an enhanced breadth of knowledge (The University of Wisconsin, 2008). NOSM includes scheduled interprofessional health teaching sessions in every year of the program and during the community placements of the students.

The NOSM program uses a distributed community-engaged learning model which includes several community placements of the students. In the first year at NOSM, students have one four-week placement in first nation communities, without physician-teachers. In the second year, students have two 4-week integrated community experiences in northern Ontario communities with populations less than 7,500, during which they interact with a physician-teacher. During a typical week, students have five half day clinical sessions, one half day community-learning session, and one half day structured clinical skills session. In year three of the program, students spend 30 weeks in communities that range in population from 5,000 – 80,000 people and have access to specialist training. The typical week is similar to year two, as described above. The five themes of the curriculum are integrated over the course of the year and medical specialties are learned in parallel. The fourth year of the program is a year-long series of clinical placements conducted in the major hospitals of Thunder Bay and Sudbury, although some rotations may be in other larger urban centers such as Timmins, Sault Ste. Marie or North Bay. During fourth year, the students rotate through a series of four-week experiences in the major medical specialties.

METHODS

Participants

The number of physician-teachers involved in the 4-week rural integrated experience in November of 2007 was 62. These physician-teachers were NOSM faculty members and were situated in twenty-five rural Northern Ontario communities. Each physician-teacher was working with one or more second-year students. The physician-teachers provided a learning environment for the students in clinical sessions at their jobs and supervised student/patient interactions.

Design

A mixed-methods approach was used to study the perceptions of physician-teachers in Northern Ontario responsible for undergraduate medical students in a 4-week rural placement in November of 2007. A mixed-methods approach was chosen to discover any underlying issues not addressed in the questionnaire results and to provide richer, more detailed explanations of the reported perceptions of the physician-teachers. In this study, the situation of medical students' rural integrated experiences is observed through the lens of the physician-teachers with the purpose of making conclusions about the perceived impact of those placements on physician-teacher practice, student participation in the community, and student performance on areas related to the curriculum. The study included an online questionnaire and follow-up interviews.

The online questionnaire topics included physician-teacher perceptions of student impact on physician-teacher practice, student participation in the community, and performance of students on areas related to the curriculum. A follow-up interview process was carried out with ten volunteer physician-teachers' to validate questionnaire results and to gain a more detailed understanding of physician-teachers perceptions of the medical students during their integrated rural community experience.

Instrument

An online questionnaire for the northern physician-teachers was pilot tested and refined by content-expert faculty directly involved with clinical teaching of students in Thunder Bay, Ontario, to determine the appropriateness of format and content. Revisions were incorporated into the final online questionnaire. The questionnaire included both closed- and open-ended questions. The questionnaires were also available to potential participants in paper format via fax, upon request. A copy of the instrument, with a summary of the responses to it, is found in Appendix I.

Procedure

Sixty-two physician-teachers who had worked directly with NOSM students during the time period of interest were invited to complete an on-line questionnaire following the physician-teachers' experience with the NOSM undergraduate, second-year students in November of 2007. The questionnaire was forwarded from the office of the Dean of Undergraduate Medical Education. A copy of the cover letter and the consent form is found in Appendix II. Follow-up

reminders to the initial invitation were done weekly by telephone. Figure 1 illustrates the method of questionnaire data collection.

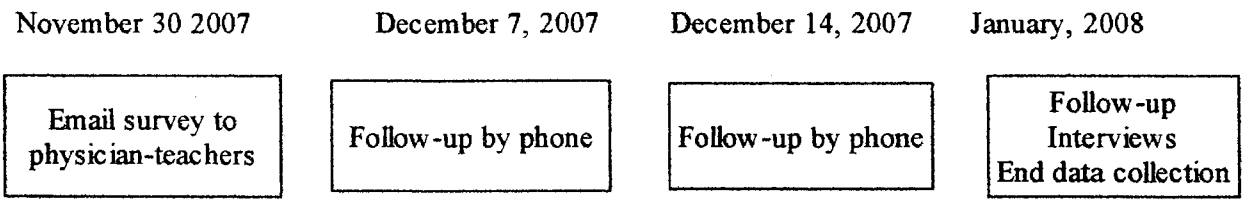


Figure 1. Data collection for integrated community experiences

On the questionnaire, physician-teachers could volunteer to be contacted by phone for a short interview. Interviews were held in January of 2008 with ten rural physician-teachers. The questions included in the interviews were open-ended and based on the research questions and a thematic preliminary analysis of the questionnaire data. The interviews were audio-taped, transcribed, and the content was analyzed into themes (notes were taken for two interviews that could not be recorded).

Ethical Issues

Ethical issues relevant to this study include respect for human dignity, respect for free and informed consent, respect for privacy and confidentiality, balancing harms and benefits, and maximizing benefit. The participants in this study participated voluntarily and had the right to withdraw from the study at any time. Results of this study may benefit the physician-teachers in the future, when they consider taking on the responsibility of undergraduate medical students.

Other benefits to participants may be the potential improvement of the NOSM program and relationship building between NOSM, the physician-teachers, the students, and the rural communities.

The instrument was designed to be easy to complete and did not require extended effort or time. In the data analysis, participants remain anonymous and conclusions are based on the group of physician-teachers, without reference to identified individuals.

Ethics approval was obtained from the Lakehead University Research Ethics Board. Ethics approval included the pilot-test of the questionnaire, the administration of the amended questionnaire to the physician-teachers, and follow-up interviews. The application for ethics approval included the use of this data for a Master's thesis. The Research Ethics Board Approval is provided in Appendix III.

Data Analysis

Descriptive statistics and graphs were used to analyze data from closed-ended questions on the questionnaire. Qualitative data collected from the open-ended questions on the questionnaire were analyzed to determine main themes. There was a content analysis of the telephone interviews. The content analysis was used to code the interviews for themes, which were developed inductively from the data. The themes were considered in relation to the literature and verbatim participants' quotes are reported to illustrate the definition and scope of the themes. A complete list of interview responses from the physician-teachers is provided in Appendix V.

RESULTS

Response Rate

There were sixty-two physician-teachers who worked directly with the second-year NOSM students during their 4-week rural placement in November 2007. Forty-five of them responded to the questionnaire, for a response rate of 71%. The results were analyzed in terms of the research questions and emergent themes were identified. Fifteen physician-teachers who responded to the questionnaire volunteered and were contacted for a short telephone interview. Ten interviews were completed.

Of the physician-teachers who responded to the questionnaire, 76% reported supervising two NOSM students; 16% had only one student, while others supervised four NOSM students. There were fifty-two students placed in twenty-five communities, working with sixty-two physician-teachers. In some of the communities the students worked with more than one physician-teacher. The variation in physician-teacher opinions does not necessarily reflect a variation of student performance. During this period, the NOSM students tended to be the only medical students on placement in those communities; 86% of the physician-teachers reported no elective students from other medical schools and 73% reported no residents from other medical schools. The physician-teachers reported that, prior to November 2007, 86% had experience supervising other NOSM undergraduates, 76% had experience supervising third- and fourth-year undergraduates from other medical schools, and 60% had supervised residents (post-graduate students in specialty training) from other medical schools. The

physician-teachers who had no experience supervising medical students from other schools could not make comparative evaluations between NOSM students and students from other schools.

Student Impact on Physician-Teacher Practice

Research Question 1 was:

What do physician-teachers describe as the impact of the second-year NOSM student(s) during a 4-week integrated rural community experience on physician-teacher practice?

The impact of the NOSM students is discussed in terms of productivity and professional aspects of physician-teacher practice.

Impact of medical students on productivity of the physician-teacher practice

Productivity of the physician-teacher practice referred to income and workload. As expected from the theoretical framework provided by Worley & Kitto (2001), most physician-teachers perceived a small negative impact on the productivity of their practice. See Figure 2, Impact of NOSM Students on Productivity Aspects of Physician-Teacher Practice, for questionnaire results.

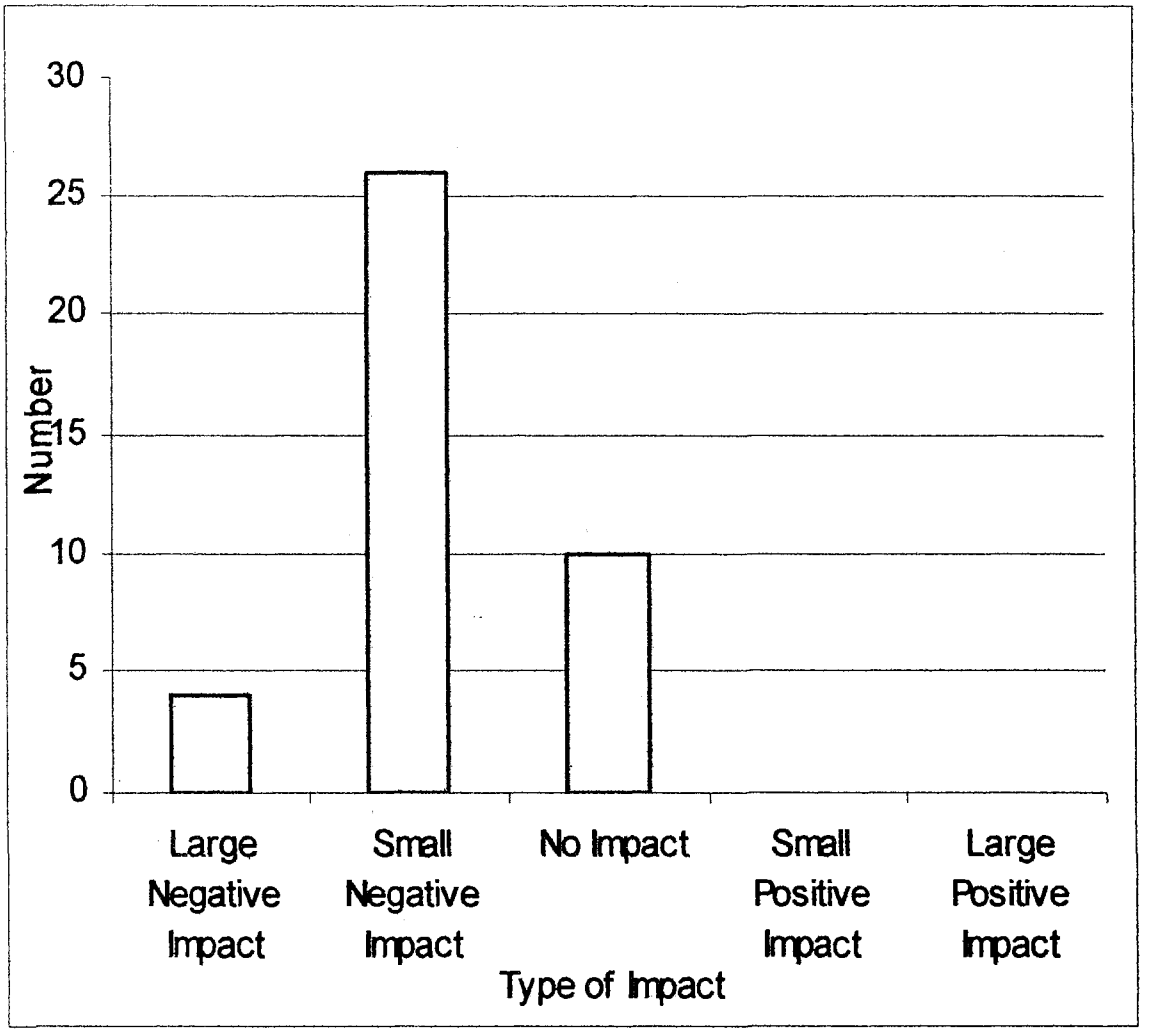


Figure 2. Impact of NOSM students on productivity aspects of physician-teacher practice

In the interviews, only one physician-teacher reported no impact on the productivity aspects of their practice. We "see the same number of patients." (Physician-teacher 1). Most physician-teachers commented that there was a negative impact on productivity. The physician-teachers attributed the negative impact to longer patient consults.

> You can't see as many patients because when you're going in to a patient consult and you're on your own, you just go click, click,

> click, click, click and with the students – you have to stop and explain why you're doing what you're doing." (Physician-teacher 2)

After the patient interviews, additional time is required by the physician-teachers to discuss the salient points of each case.

> "Time to see the students after a patient interview is longer – this reduces work flow" (Physician-teacher 3)

The students need time of their own to perform patient examinations.

> "Decreased the number of patients I could see in a day and changed my patient flow. In order to teach the students we have to allow them adequate time to examine the patients with significant findings. It just slowed my practice down" (Physician-teacher 7)

The presence of the students caused delay times for the patients who were waiting to be seen, so less patients could be attended to.

> "We were always running behind and people were waiting too long – so I just decided to book much more lightly." (Physician-teacher 10)

Impact of medical students on professional aspects of physician-teacher practice

As expected from the theoretical framework provided by Grayson et al. (1998) the physician-teachers' perceptions of the impact of NOSM students on professional aspects of their practice (which included considerations of office operation, patient care, relations with colleagues, and professional goals) were generally positive, although there were a few physician-teachers who reported small negative impacts. See Figure 3, Impact of NOSM Students on Professional Aspects of Physician-teacher Practice, for questionnaire results.

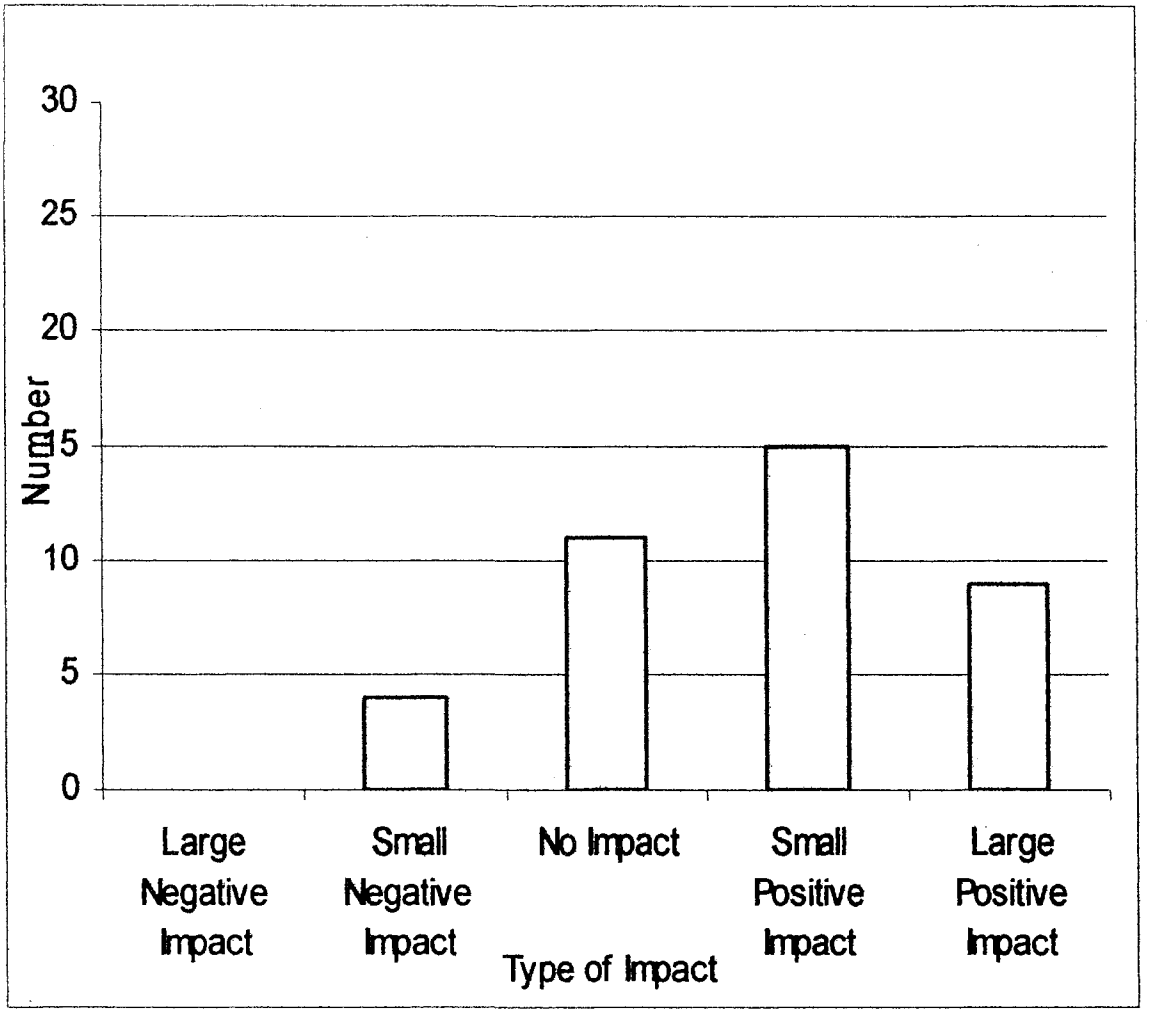


Figure 3. Impact of the NOSM students on professional aspects of physician-teacher practice

In the physician-teacher interviews regarding the impact of medical students on the professional aspects of physician-teacher practice, one physician noted that the students had no impact on practice.

> "The interaction with the patients is essentially the same – you just have to explain the stuff to the student as you're going." (Physician-teacher 2)

The majority of physician- teacher comments referred to the positive impacts of the student placements on the professional aspects of physician-teacher

practice. Several physician-teachers attributed the positive impact of the students' presence as encouraging them to keep current on medical practice

> "It was very positive. They force you to review material so you can demonstrate your treatment plan is correct. It keeps you on your toes. It's a positive environment. Students bring state-of-the-art practices and treatment plans; this helps you to up-date your practice. They may suggest new ideas or methods." (Physician-teacher 3)

Other physician-teachers commented on the positive atmosphere generated by the presence of the students in the working environment.

> "I think they have a positive impact on the professional atmosphere in that it changes the dynamics in the clinic, in that patients now have to see a learner. I just think it sets things up in a very positive light – certainly in our town. Patients like seeing learners here." (Physician-teacher 4)

When asked to compare the actual impact of NOSM students with their expected impact on practice, 100% of the physician-teachers perceived the impact on the professional aspects of their practice was about what they expected or more positive than they expected; while100% of the physician-teachers perceived the impact on the productivity aspects of their practice was about what they expected or less positive than they expected.

In the interviews, two themes emerged that indicated the sources of physician-teacher expectations. Some physician-teachers indicated that their expectations were based on their experience with third- or fourth-year undergrads or residents from other programs.

> "I've been doing this for 30 years, so I think my expectations are fairly realistic." (Physician-teacher 6)

> "We have had primarily what would be called clerkship students from other universities which would be more advanced – so we just figured they

> would be a little bit less advanced than those students would be." (Physician-teacher 10)

Other physician-teachers noted their expectations were based on an understanding of the NOSM curriculum and admissions policy. Physician-teachers who based their expectations on knowledge of the northern and rural health curriculum indicated that their expectations were generally high.

> "I was expecting them to be bright and engaged and part of that was knowing the previous NOSM students – what their levels had been at – and part of it was having... participated in medical resident interviews before – and seeing CV's that people were presenting – so we do tend to have high expectations." (Physician-teacher 1)

Student Participation and Experience in the Community

Research Question 2 was:

What do physician-teachers describe as community participation of second-year NOSM students during a 4-week integrated rural community experience?

Three areas related to community participation of the NOSM students were explored: participation in community-level health care including advocacy, teaching, and public speaking; working with community health professionals, i.e., nurses, midwives, pharmacists, Community Care Access Centres (CCAC), and diabetes health clinics; and participation in community life i.e., social or cultural activities. As expected, physician-teachers reported that participation of the second-year NOSM students in the community tended to be about the same as or better than third- and fourth-year elective undergraduate medical students from other schools.

In the area "working with community health professionals", 40% of physician-teachers reported that the NOSM students had participated more than

elective students from other medical schools. The physician-teachers interviewed attributed the increased participation to the NOSM curriculum, which includes regular community-based interprofessional learning experiences integrated into the students' schedule. This type of scheduling accounts for increased participation working with other health professionals.

Physician-teachers who reported that NOSM students participated less than students from other medical schools noted in the open-ended comments of the questionnaire that the concurrent responsibilities of NOSM students to complete the community placements, learn the curriculum, and study for exams were not shared by the elective students from other schools. The NOSM students were second-year students who had whole group teaching sessions and other scheduled learning experiences. Students from other schools are typically third- or fourth-year students who have completed the curricular aspects of first- and second-year medical school. See Figure 4, Physician-teacher Perceptions of Community Participation of NOSM second-year Students Compared to Medical Undergraduates from other Schools.

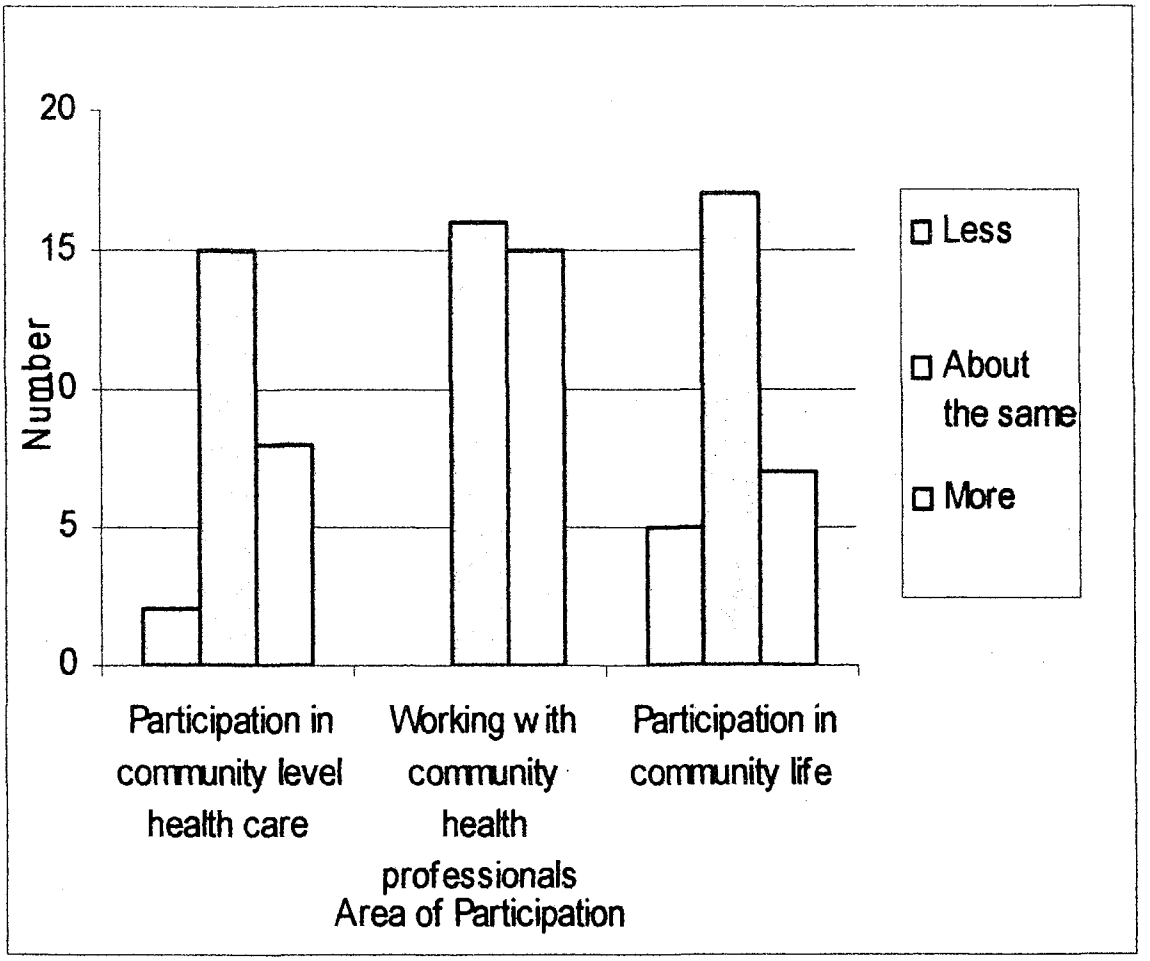


Figure 4. Physician-teacher perceptions of community participation of NOSM second-year students compared to medical undergraduates from other schools

Two main themes emerged from the interviews. The first theme had to do with the participation level of the students in the community and the second theme related to the scheduled interprofessional activities The physician-teachers' comments varied as applied to participation level. Some physician teachers reported the NOSM students participated in community activities more than other elective students.

> "The last students that we had did an exceptional job of being self-directed -seeking unique opportunities for healthy interaction with the community. Some examples I can give are: just simple things such as within the organization, going to the kitchen talking to the

> staff, having lunch with them, most staff take for granted that that's not something that's ever been done – secondly – outside of the organization they have gone to different bazaars, bake sales, bingo. They just did really well at integrating with the community. One of the things that I try to do is extend an invitation for the learners to use the local gym and swimming pool. They actually get a letter from the Mayor and things like that and they get free passes while they're here – and the students last time took advantage of that. The other thing – one of the main employers in town is the saw-mill and we offered them a tour of the saw-mill just to make them aware of where most of the men in town work at – and they took off to the idea. We arranged for a tour of the saw-mill. They came out with hard hats on – real troopers – getting out there learning. So I really felt that they truly got an enriched experience in the community part, which I think is so vital and in 110 they really didn't take advantage of opportunities. You know they go to the bingo and they met people there they sat with and the next day those people were patients. So right away the dynamics were changed and because they've had the increased interaction, obviously, it was a positive experience – they knew them from a social setting." (Physician-teacher 4)

Some physician-teachers felt the students participated less than other elective students. The reduced participation was attributed to the curricular responsibilities of the students.

> "When the students are on elective rotations, they're not facing immediate examination. They often seem to feel less of a time pressure that they can take advantage of some of the cultural activities that are going on. Whereas when the NOSM students are here, because of the nature of their rotation, their various commitments, they tend to spend more time studying." (Physician-teacher 1)

Several physician-teachers perceived the NOSM participation was about the same as elective students from other schools.

> "We had another medical student at the same time – overlapping by a good chunk of it – so that some of the things they participated in were identical; some were different." (Physician-teacher 1)

> "In terms of just being aware of recreational events in the community and just being involved in normal community events, it was about the same." (Physician-teacher 10)

The second theme was related to the scheduled interprofessional activities. Several physician-teachers reported the NOSM students participated in more interprofessional educational opportunities.

> "The community placement that was built into the curriculum was certainly much more involved than other medical students. That was a result of the program." (Physician-teacher 6)

Two physician-teachers commented that the scheduled interprofessional activities were not perceived positively by the students.

> "Community sessions, where they were going to home care or public health or any of those kinds of things, were rated less useful by the students and I think it's because of the decreased amount of actual person contact they had and more sort of following or watching." (Physician-teacher 5)

Two physician-teachers commented on the benefit of students' integrated community experiences on the community.

> "The consistency of the students coming, i.e. knowing that we're expecting four students per year, is an important piece I think both for our practice and for the community." (Physician-teacher 8)

> "Our community is opening up more to them because we're getting more familiar with having students around. So I think the increased number of students is a benefit because it's becoming more of a routine for the community, as well for the hospital employees and community and for the physician community. So just having a regular flow of students is beneficial to both sides. The electives may be very sporadic, maybe once every two years. Knowing we're going to have students in November and February – people get geared up a little more and the hospital - more interested." (Physician-teacher 10)

Student Performance on Areas Related to the NOSM Curriculum

Research Question 3 was:

What do physician-teachers describe as the performance of the second-year NOSM students during a four-week integrated rural community experience on selected areas related to the curriculum of the NOSM?

Selected areas related to the curriculum that were considered include: knowledge of rural and northern health (specific to the NOSM curriculum), preparedness for isolation or a rural context, patient-centred approach to healthcare and community-centred approach to healthcare. The physician-teachers perceptions of student performance during the placement were compared to the expectations of performance that the physician-teachers had prior to the student placement. Almost 100% of the physician-teachers perceived the performance of the students was as positive as or more positive than they had expected. Physician-teachers reported in the questionnaire that their expectations of the students performance was high, based on the physician-teacher understanding of the NOSM curricula and admissions policies
See Figure 5, Physician-teacher Perceptions of the Performance of NOSM Students Relative to Physician-teacher Expectations on Selected Areas of the Curriculum

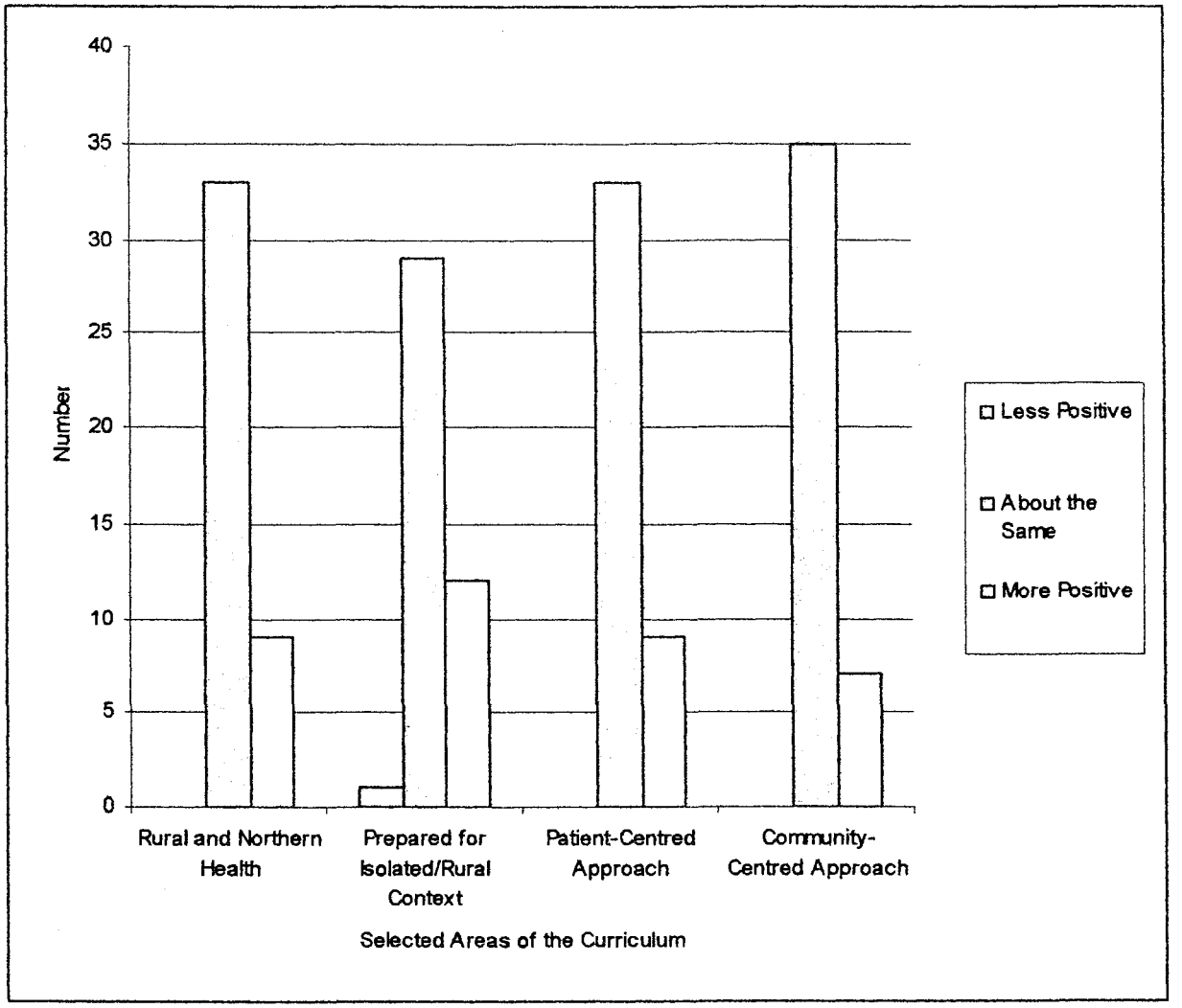


Figure 5. Physician-teacher perceptions of the performance of NOSM students relative to physician-teacher expectations on selected areas of the curriculum

The majority of physician-teachers interviewed reported that the second-year NOSM students performed as well as or better than elective third- and fourth-year students from other medical schools on selected areas of the curriculum. Positive comments were made by 70% of the interviewed physician-teachers related to areas of student performance.

Two themes arose during the interviews. Several physician-teachers reported that the medical students' knowledge and performance on areas related to aboriginal health were more positive than that of students from other programs

they had supervised in the past. Examples of comments on these themes are noted below.

> "Family structures in native communities are often different. Women often have multiple partners and sometimes that's an issue that people find something derogatory about it. I think the students that we had, had an understanding of how this may happen in the native community. Also, they had a better understanding of how some first nation cultures view death and dying. They realized when they came in, that they actually do these things differently – which was good." (Physician-teacher 2)

> "On aboriginal issues – their knowledge was better – perhaps that was due to their experience and background." (Physician-teacher 9)

Several physician-teachers commented on the performance of the students on areas related to northern and rural health. The students were noted as being more aware of issues faced by rural practitioners and more interested in practicing in that area.

> "They would have a particular interest in rural and northern medicine attributes and we found that to be true." (Physician-teacher 1)

> "Well, I knew that they had specific lectures and experiences focused on these kind of issues, so I expected them to more up on that stuff than students from other programs, and they were. My expectation was they would be better, have more knowledge and awareness of those issues, and they did." (Physician-teacher 2)

Comments were made regarding students' overall performance, not directly linked to the Northern and Rural Health Curriculum.

> "The skills they learn in their curriculum that relate to interviewing are linked. They see how systems interact early in their training; they are further ahead. The other students catch up, but the NOSM students had a more broad knowledge, earlier. They have more patient exposure in their curriculum; they are better at interviewing skills; they have a system; they approach problems in a more organized, less scattered way; they give concise explanations of the problem and a treatment plan. Other students only list the problems and don't seem to have a plan. (NOSM students) can sort the information into a treatment plan." (Physician-teacher 3)

Open-ended queries in the questionnaire identified two additional concerns of the physician-teachers in regard to the NOSM students. The areas of concern were: "impact of background and experience on the students" and "impact of the responsibility of curriculum and exams". I explored these two topics in the interviews, and there were several comments that addressed different aspects of these themes.

Impact of Background and Experience on the Students

The impact of background and experience on student performance was addressed with respect to their rural origin and their previous undergraduate training. Two themes related to background and experience came out of the interviews. Several physician-teachers perceived that the rural background of the NOSM students they supervised had a positive impact on the preparedness and ability of the students to work in a rural environment. The physician-teacher comments were concerned with the students' awareness of the complexity of health care in rural setting and the attunement of the students with the rural environment.

> "Students from small communities, who have had contact with health care providers and health care in general, being from a small community, would be much more aware of the intimate details of what it's like to be in a small community and to practice in a small community." (Physician-teacher 8)

One physician-teacher perceived that the rural background of the student(s) had a negative impact on the performance and community involvement of that individual. He commented:

> "I think that was taken for granted and they didn't go out of their way to see what this particular town had to offer." (Physician-teacher 6)

Another consideration that arose from the questionnaire was the impact of the students' undergraduate training on the students' performance and community participation. The admission policy of NOSM does not require a traditional undergraduate science background. Several physician-teachers commented that the diverse backgrounds of the students were positive. Some comments referred to their student's nursing background.

> "I found they were more knowledgeable, more accomplished about medicine theory in general, than other second-year students. I don't know if that's due to the curriculum or whether it's a reflection on students' previous background experience. I know one was a previous emerg nurse before she went to medicine – my last batch of students. I found their breadth of knowledge exceeded my expectations for second-year students." (Physician-teacher 7)

Some physician-teachers reported that different undergraduate backgrounds were beneficial in that they contributed to a well-rounded and flexible student.

> "I think, philosophically, that bringing people in from different backgrounds usually makes them better rounded, so that they're better all-round individuals. They're also bright enough that they're able to catch up on scientific issues; so, I think having people from different backgrounds is a good idea. It'll help them in the long run – so they don't just focus on the job – which I think is a detrimental thing with medical people." (Physician-teacher 2)

Impact of the Responsibility of Curriculum and Exams

The issue of the impact of the added responsibilities of curriculum and exams on the second-year NOSM students was raised in the questionnaire and explored in the interviews. Third- and fourth-year elective students have completed the curricular obligations. Half of the interviewed physician-teachers perceived that the added curricular responsibilities of the second-year NOSM students detracted from their rural experience.

> "It seemed like there were times that they were involved in studying for exams. Writing exams may detract from continuous hands-on experience while they were in the rural setting. For example, I would have them Monday and Thursday and they weren't able to come because 1. They were with other practitioners, or 2. They had something else – they had an exam coming or study break." (Physician-teacher 7)

Half of the physician-teachers noted that the NOSM students' placement was fundamentally different from elective students.

> "My expectation was that it is essentially an academic year." (Physician-teacher 5)

The physician-teachers noted the students were balancing the responsibilities of the placement and the curriculum, with an understanding that the placement was different.

> "Exams take away from the community experience, but students blend both responsibilities very well and did both." (Physician-teacher 3)

Several interviewed physician-teachers noted that the clinical performance for the NOSM students was similar to third- and fourth-year elective non-NOSM students (Physician-teachers 1, 4, 6, 9, 10), and some physician-teachers noted

that the difference between students depends on the individuals involved (Physician-teachers 1, 2, 8, 10). Every interview ended with an opportunity for the physician-teachers to add any comment that they had not previously mentioned. Comments that related to the themes mentioned above were included in the thematic analysis. Two comments did not apply to the themes. The first comment indicated a negative impression of the NOSM students' attitudes: "NOSM students may not be quite as dedicated or as hard working, maybe, perhaps a little more cocky" (Physician-teacher 6). The final comment refers to the positive personal experience of the physician-teacher:

> "I had a much better experience than I've had in the past with other students generally. I was actually debating whether I would continue at one point. In my practice, they were particularly enthusiastic. I just feel that as a preceptor we're giving up our time and they really appreciated it and worked hard. They were excellent. It was an extremely positive experience from my perspective." (Physician-teacher 7)

DISCUSSION

This study is intended to expand the limited medical education literature on the perceptions of physician-teachers regarding medical student experiences in rural communities. The contribution of this study is to describe, from the perspective of the rural physician-teachers, the impact of undergraduate medical student placements from this medical school on physician-teachers' practice, student participation in the community, and the impact of the Northern and Rural Health curriculum on student performance. The results of this study have implications for practice as well as theory.

Response Rate

The response rate of the physician-teachers in this study was high at 71%. The Canadian Institute for Health Information (2005) reports a typical response rate for physicians of 36%. Several strategies were used to elicit a positive response rate. The cover letter for the questionnaire was personalized for each physician-teacher. Research shows that personalizing requests to physicians results in higher response rates (Olsen, Schneiderman, & Armstrong, 1993). The initial request was sent from the offices of the Founding Dean of the Northern Ontario School Medicine and the Associate Dean for Undergraduate Medical Education. In the cover letter of the questionnaire, the Deans emphasized the importance of the research project to the program offered by the school. The initial request was emailed or faxed to the physician-teachers and immediately followed up by a personal phone call to the office of every physician-teacher who had worked with the NOSM medical students. Telephone contact was shown to

be more effective in producing positive response rates than simply web or faxed approaches (VanGeest, Johnson, & Welch, 2007). Follow-up contact was done twice by personal phone calls. Responses continued to come in six weeks after the initial appeal.

The results of the research are discussed in relation to the three foci of the investigation: impact of the students on the physician-teacher practice; participation of the students in the community; and performance of the NOSM students relative to physician-teacher expectations and compared to students from other medical schools, where the focus on northern and rural health is not a required part of the curriculum. The information from the physician-teachers with regard to the importance of the background and experience of the students indicates that the differences in performance, while linked to the curriculum, may also be related to the admissions policies of the school.

Student Impact on Physician-Teacher Practice

The results support previous research on the benefits and drawbacks of student placements on physician-teachers' practice. The physician-teachers perceived a positive impact on the professional aspects of their practice. Either their experience with previous student placements or the physician-teacher preparation had led them to expect a positive student impact. One hundred percent of the physician-teachers indicated their perception that the impact of the students was as positive as or more positive than they had expected. A positive physician-teacher perception of the impact of student placements on physician-

teacher practice may increase physician-teacher's willingness to assume the responsibilities of supervising students.

The impact on professional aspects was similar to that reported by Norris et al. (2006). Norris et al. reported that 81% of physician-teachers from the University of Washington's WWAMI program indicated that there was a positive impact on physician-teacher practice related to keeping current. Our results, which were from a new program, indicate that 60% of the physician-teachers reported a positive impact on professional aspects. The perception that "they keep us up-to-date" supports the WWAMI research on the positive impact of keeping current.

The physician-teachers perceived a small negative impact on the productivity aspects of their practice. One hundred percent of the physician-teachers indicated their perception that the impact of the students was as positive as or less positive than they had expected. No physician-teacher indicated they experienced a more positive than expected impact on the productivity aspects of their practice. The impact on productivity aspects of physician-teacher practice was similar to Norris et al.'s (2005) study, where 44% of physician-teachers perceived a negative impact on workload, and Grayson's (1998) study, where 61% perceived a decrease in the number of patients seen. Of the physician-teachers in this study, 71% perceived a negative impact on productivity. A negative physician-teacher perception of the impact of student placements on physician-teacher practice may reduce physician-teacher's willingness to assume responsibilities for supervising students.

The lower percentage of physician-teachers who reported a positive impact on professional aspects of practice and the higher percentage of physician-teachers who reported a negative impact on the productivity aspects of practice may, in part, be accounted for by the introductory nature of the program at NOSM. The WWAMI program was created in the 1970's and has a long history of implementing a successful system for rural placements. Fields et al.'s (1994) study did not perceive any significant negative effect of student placement on productivity. The students in that study were third-year students, however, who were able to take over some patient care responsibilities from the doctors. When students become productive, on their own, Worley & Kitto's (2001) study suggests that they impact physician-teacher productivity in a positive way.

The results of this study are consistent with work done by Hunt et al. (2007) on physician-teacher expectations of the impact of NOSM medical students on physician-teacher's medical practice. In the current study, the perceived experience of the physician-teachers was similar to the expectations reported by Hunt et al. who found that physicians expected students to have a slightly positive impact on the professional aspects of their practice and a slightly negative impact on the productivity aspects of their practice.

Consistent with Worley & Kitto's (2001) model of student impact on rural general practice productivity, the physician-teachers had a negative perception of the impact of the students' four-week rural integrated community experience on their practice productivity. Worley gathered data at the five- and eight-month points in a year-long placement. They did not gather data during the first weeks/months of the placements. They speculated, based on existing data in the

literature, that there was an initial negative impact of the student placements on physician-teacher productivity. This research has implications for Worley's theory in that it provides additional evidence to support the speculation of an initial negative impact by student placements on physician-teacher productivity for a four-week placement.

Questionnaire results indicate that 60% of physician-teachers perceived a positive impact on the professional aspects of their practice. These results give some support to Grayson's (1998) theory that if physicians teach they would perceive a positive impact on the professional aspects of their practice. In Grayson's study, 82% of physician-teachers reported a positive effect on their professional growth and enjoyment of practice. The physician-teachers in that study were responsible for one established course which had been evaluated over seven years. Since the current research relates to one short-term placement of a new program, the results would not be expected to be as positive as Grayson's.

Student Participation and Experience in the Community

The physician-teacher perception of NOSM students' community participation was positive, particularly in social interactions and relationship building. An increased participation of the students in the community may mean more opportunity for the NOSM students to development the connections in the community that are necessary for a community-school partnership, as described by Bauch (2000). Several teachers commented on the benefits to the community of having regular medical student placements.

Forty-four percent of the physician-teachers reported that the NOSM students participated in community events more than elective medical students from other schools, even though several felt the responsibilities of the second-year curriculum reduced the students' opportunity for participation. This begins to provide some support to extend Kataoka-Yahiro et al.'s (1998) model for learning-service community partnership to medical schools with rural placement programs. The components of Kataoka-Yahiro's learning-service community partnership model are similar to the integrated rural experiences of NOSM. The NOSM and the communities are in a mutually reciprocal relationship that provides a learning environment for the students and service for the community. In the current research, the direct service to the community is long-term, based on the eventual establishment of additional physician practices in the area. While there are short-term benefits, as noted by the physician-teachers in the study, the students are not involved directly in setting up and carrying out programs in the community, while on placement, as in Kataoka-Yahiro's study. There is some evidence from this research that the learning-service community partnership model can be extended to situations where the benefit for the community is a future benefit, because of the types of connections occurring during the placements. Examples of the connections Bauch (2000) noted as being necessary for a successful school-community partnership have been reported by the physician-teachers. They include: building on social capital by participation, having a sense of belonging due to student background and training, and using the community as a curricular resource during community placements, which is part of the NOSM program.

One hundred percent of the physician-teachers perceived the NOSM students' involvement with other community health professionals as positive as or better than expected. Forty percent reported the NOSM students were more involved than other students. This positive result is encouraging for continuing administration's efforts to schedule interprofessional education opportunities for medical students.

Student Performance on Areas Related to the Curriculum

Every physician-teacher in this study perceived that the NOSM students performance on selected areas of the Rural and Northern Health Curriculum was as they expected and occasionally, better than they expected. The hypothesis that the physician-teachers would report a more positive perception of student performance than expected was not completely supported by the results of this study. Most physician-teachers reported that the students' performance on areas related to the curriculum was about as positive as they expected. This may be due to the high expectations many physician-teachers said they had because of their knowledge of the Northern and Rural Health curriculum and/or the background and experience of the students. In the interviews, several teachers commented that the performance of the second-year NOSM students was as good as, if not better than third- and fourth-year students from other medical schools. While no causal links can be determined, 100% reported that the NOSM students' knowledge of issues related to northern and rural health were as positive as or more positive than expected. The positive response was expected, based on Dewey's theory of knowledge production. If the students receive training in northern and rural health, Dewey's model projects the students'

performance in that area will improve. These results may provide some support for extending Dewey's model of knowledge production to specialized curriculum for medical students. Curriculum and hands-on experience related to an educational goal may encourage students to be better adapted to practice (Dewey, J. 1929). Based on this study we cannot comment on the relative importance of the contribution of the curriculum, as other program attributes or individual differences in background and experience may have impacted student performance, as well.

Limitations

This study focused on rural physician-teachers' perceptions of the impact of NOSM second-year students during a four-week rural integrated community experience. It provides a snap-shot in time of those physician-teachers' perceptions of the students they had and has several limitations. Twenty-nine percent of the physician-teachers did not respond to the questionnaire. Their perceptions may have altered the results reported here. The questionnaire was sent out two weeks subsequent to the placement of the students and several physician-teachers answered the questionnaire weeks later. The interviews were completed six weeks after the placement. The retrospective aspect of the physician-teacher responses may have impacted the responses. Had the students or physician-teachers been different, or if the data had been collected at another time, the results may have reflected a different picture. The student placements varied. They may have been one-to-one, two-to-one, or four-to-one with one or more physician-teachers, Therefore, some of the different physician-teacher perceptions are related to the same students. Descriptive statistics and

graphs must be interpreted with caution, as they represent a small number of physician-teachers in a particular area, at one moment in time. The subjective assessments of the respondents might limit the generalizability of the findings. The diversity of placement sites, however, may allow for some generalized application of the results. The retrospective comparisons of the NOSM students to elective undergraduate students from other medical education programs apply to both groups, although the non-NOSM students were mainly from an earlier experience. The admissions policy of the medical school program, particular to NOSM, may impact student selection and therefore should be considered when interpreting results of this study. The students, themselves, may impact the perceptions of the physician-teachers, regardless of the rural community placements or curriculum.

CONCLUSIONS

Implications of Results for Selected Stakeholders

The results of this research have implications for several stakeholder groups: administrators, rural physicians, rural communities, and students.

Administrators

Administrators responsible for recruiting physician-teachers may use the results of this research to inform prospective physician-teachers that their colleagues perceive a positive impact of students on the professional aspects of practice. NOSM's program has regularly scheduled student placements that the rural physician-teachers have reported in this study to be of benefit to the communities. Both of these findings may be relevant to the recruitment of rural physicians to take on physician-teacher responsibilities.

Since the majority of the physician-teachers perceived a negative effect on the productivity aspects of their practice, administrators of these programs may want to explore the literature to discover methods and techniques that will minimize the negative student impact on productivity. Faculty development opportunities could be created to educate the physician-teachers on the application of these strategies.

The impact of the responsibility of curriculum and exams was explored in the interviews, and had mixed results. Some physician-teachers noted a negative impact on students and other physician-teachers understood the responsibility of curriculum and exams to be part of the NOSM program. These mixed results

indicate the variance in acceptance by the physician-teachers of the different program with dissimilar obligations. It is a change from their past experience with third- and fourth-year students. Over time, the physician-teachers adjust to the alternative focus of the program for second-year NOSM students.

Administrators responsible for curriculum planning have some indication from this research that NOSM students' performance is as positive as or more positive than that of students from other programs. Northern and rural health curriculum may increase student comfort, confidence and community involvement in northern and rural environments.

The scheduling of placements with other health professionals in the community is increasing the opportunity for the students to participate in interprofessional education. Since forty percent of the physician-teachers perceived that the student participation with interprofessional learning was more positive than expected, there is some evidence that scheduling these placements does increase this type of collaboration. Students from other schools also had opportunities for interprofessional educational experiences, but they were organized on an ad hoc basis by the physician-teachers and not scheduled as part of the curriculum by the medical school. This research provides some support for the administration to schedule these opportunities for students and increase their experience with interprofessional education.

Rural Physicians

It is important to rural physicians who are considering taking on undergraduate medical students to be aware of the contribution of students to

their practice, student involvement in the community, and student performance in areas specific to their environment. This research has focused on rural physician-teachers' perceptions and provides collegial information for physicians who are considering being involved in the student-placement program. The results of this research show a positive effect on the professional aspects of practice by NOSM students, equal or greater community participation by students, and equal or better performance on areas related to the curriculum by students. The NOSM students are being encouraged by the program to participate in interprofessional opportunities in the community. Comments like the one noted below can only encourage rural physicians to participate in an active and continuous program.

> I had a much better experience than I've had in the past with other students, generally. I was actually debating whether I would continue at one point. In my practice they were particularly enthusiastic. I just feel that as a preceptor, we're giving up our time and they really appreciated it and worked hard – they were excellent. It was an extremely positive experience from my perspective.

Communities

This research provides information for communities on increased student participation and more student involvement in social interactions and trust building. Information from local physician-teachers regarding the positive contribution of the students will be useful to communities when they are making decisions on accepting regular student placements. Physician-teachers have expressed the importance of the on-going and regular placement of students. When the students participate more, there is a greater opportunity for relationship building. The learning-service model of Kataoka-Yahiro et al., (1998) describes a

mutually reciprocal relationship, by way of social interaction and relationship building, for planned future medical practice in the communities. One hundred percent of the interviewed physician-teachers perceived NOSM student participation in the community was as good as if not better than that of elective students from other schools. Communities who make a commitment to supporting student placements will be reassured to know that students will participate in the community during their placement. The long-term goal of physician placement may be supported by the relationship building that occurs during the community placements.

Students

The results from this research show that the physician-teachers perceive that the second-year NOSM students are performing well in areas specific to the curriculum, and in some cases, better than students in years three and four from other medical schools. Within the contextual boundaries of this study , this feed-back from physician-teachers can reassure prospective students that NOSM, while focused on the specific goal of producing rural physicians, provides comparable medical training.

Future Research

There are several areas that merit future research. The NOSM students' perceptions of the short-term rural placement experiences should be collected and used to triangulate the results from physician-teachers. As well, similar questionnaires could be used in a longitudinal study to determine if the results change as the Northern Ontario School of Medicine continues to develop.

Additional research is needed to consider the long-term impacts of the third-year NOSM program which has a continuous eight-month integrated rural experience. A comprehensive study would include physician-teacher, student, and community perceptions. Results from short-term placements may be significantly different than those of long-term placements. A long-term community impact project that considers how the participation and partnership building with the community changes over time will provide more information on the medical school's learning-service partnership with the community. A long-term study of where and how the graduated physicians choose to practice is needed to determine if Darling-Hammond's (2000) theory that "integrated programs with extended clinical preparation interwoven with course work" produce professionals who are" both more effective and more likely to enter and stay" (p. 166) in the profession, extends to the focused curriculum and the rural placements of medical students.

References

American Psychological Association. (2001). *Publication Manual of the American Psychological Association.* Washington, DC: American Psychological Association.

Ashar, B., Levine, R., Magaziner, J., Shochet, R., & Wright, S. (2007). An association between paying physician-teachers for their teaching efforts and an improved educational experience for learners. *Journal of General Internal Medicine, 22*(10), 1393-1397.

Barritt, A., Silagy, C., Worley, P., Watts, R., Marley, J., & Gill, D. (1997). Attitudes of rural general practitioners towards undergraduate medical student attachments. *Australian Family Physician, 26*(Suppl 2), S87 – S90.

Bauch, Patricia A. (2000). *School-community partnerships in rural schools: Leadership, renewal, and a sense of place.* Paper presented at the Annual Meeting of the American Educational Research Association, New Orleans, LA.

Canadian Institute for Health Information. (2005). *Analytical survey: 2004 national physician survey response rates and comparability of physician demographic distributions with those of the physician population.* Retrieved on February 26, 2008 from http://www.nationalphysiciansurvey.ca/nps/reports/PDF-e/CIHI_Analytical_Bulletin.pdf

Cresswell, J. W. (2003). *Research design qualitative, quantitative, and mixed methods approaches* (2nd. Ed.). Thousand Oaks, CA.: Sage Publications.

Critchley, J., DeWitt, D. E., Khan, M. A., & Liaw, S. T. (2007). A required rural health module increases students' interest in rural health careers. *Rural and Remote Health, 7,* 688. Retrieved May 10, 2007 from the Rural and Remote Health database.

Curran, V. & Rourke, J. (2004). The role of medical education in the recruitment and retention of rural physicians. *Medical Teacher, 26*(3), 265-272.

Darling-Hammond, L. (2000). How teacher education matters. *Journal of Teacher Education, 51(3),* 166-173.

Dewey, J. (1929). *The sources of a science of education.* New York: Horace Liveright.

Fields, S. A., Toffler, W. L., & Bledsoe, N. M. (1994). Impact of the presence of a third-year medical student on gross charges and patient volumes in 22 rural community practices. *Academic Medicine, 69*(10), S87 – S89.

Geyman, J. P., Hart, L. G., Norris, T. E., Coombs, J. B., & Lishner, D. M. (2000). Educating generalist physicians for rural practice: How are we doing? *The Journal of Rural Health, 16*(1), 56 – 80.

Grayson, M., Klein, M., Lugo, J., & Visintainer. P. (1998). Benefits and cost to community-based physicians teaching primary care to medical students. *Journal of General Internal Medicine, 13,* 485-488.

Halaas, G. W. (2005). The rural physician associate program: New directions in education for competency. *Rural and Remote Health, 5,* 359. Retrieved May 10, 2007 from the Rural and Remote Health database.

Health Canada, *Interprofessional education for collaborative patient-centred practice.* Retrieved March 18, 2007 from http://www.hc-sc-gc.ca/hcs-sss/hhr-rhs/strated/interprof/index_e.html

Health Canada, *National Expert Committee (NEC) on interprofessional education for collaborative patient-centred practice.* Retrieved April 8, 2008 from http://www.hc-sc.gc.ca/hcs-sss/hhr-rhs/strateg/interprof/national_e.html

Hunt, D., Zmijowskyj, T., Decker, C. & Reinikka, M. (2007). *Understanding "buy-In" of physicians involved in a new medical school.* Unpublished paper presented at the meeting of the Association of Faculties of Medicine of Canada, Victoria, B. C. Retrieved April 8, 2008 from http://www.afmc.ca/pdf/2007_am_r&d_abstracts.pdf

Jones, G. I., DeWitt, D. E., & Cross, M. (2007). Medical students' perceptions of barriers to training at a rural clinical school. *Rural and Remote Health, 7,* 685. Retrieved May 10, 2007 from the Rural and Remote Health database.

Kataoka-Yahiro, M., Cohen, J., Yoder, M., & Canham, D. (1998). A learning-service community partnership model for pediatric student experiences. *Nursing and Health Care Perspectives, 19(6),* 274-281.

Lowes, R. (1998). Patient-centered care for better patient adherence. *Family Practice Management.* Retrieved from the American Association of Family Practice database http://www.aafp.org/fpm/980300fm/patient.html

Norris, T. E., Coombs, J. B., House, P., Moore, S., Wenrich, M. D., & Ramsey, P. G. (2006). Regional solutions to the physician workforce shortage: The WWAMI Experience. *Academic Medicine, 81*(10), 857-862.

Northern Ontario School of Medicine. *A brief overview of the curriculum.* Retrieved October 22, 2007 from: http://www.normed.ca/programs/undergraduate/mdprogram/documents/files/CurriculumOverview.pdf

Olsen, L., Schneiderman, M., & Armstrong, R. (1993). Increasing physician survey response rates without biasing survey results. *Proceedings of the Survey Research Methods Section, American Statistical Association 1993, USA*, 1036-1041.

Rabinowitz, H. K., Diamond, J. J., Markham, F. W., & Paynter, N. P. (2001). Critical factors for designing programs to increase the supply and retention of rural primary care physicians. *Journal of the American Medical Association, 286*(9), 1041 – 1048.

Reinikka, M., van Barneveld, C., & Shores, J. (2007). Clinical clerkship in a rural setting. Paper presented at the meeting of the Northern Health Research Conference, Sault Ste. Marie, ON.

Romanow, R. (2002). *Building on values: The future of health care in Canada.* Retrieved March 18, 2008, from http://www.hc-sc.gc.ca/english/pdf/romanow/pdfs/HCC_Final_Report.pdf

Rourke, J. (2008). Increasing the number of rural physicians. *Canadian Medical Association Journal.*• 178 (3). Retrieved April 8, 2008 from http://www.cmaj.ca/cgi/content/full/178/3/322

Smucny, J., Beatty, P., Grant, W., Dennison, T., & Wolff, L. T. (2005). An evaluation of the rural medical education program of the State University of New York Upstate Medical University, 1990-2003. *Academic Medicine, 80(8),* 733-38.

Statistics Canada. (2007). *Census metropolitan area and census agglomeration influenced zones (MIZ).* Retrieved October 22, 2007, from: http://www12.statcan.ca/english/census01/Products/Reference/dict/geo010.htm

The University of Wisconsin. (2008).*Interprofessional health @ UW-Madison.* Retrieved April 8, 2008 from http://interprofessionalhealth.wisc.edu/whatis.cfm

VanGeest, J., Johnson, T. & Welch, V. (2007). *Methodologies for improving response rates in surveys of physicians.* Retrieved March 3, 2008, from: http://ehp.sagepub.com/cgi/content/abstract/30/4/303.

Walling, A. D., Sutton, L. D., & Gold, J. (2001). Administrative relationships between medical schools and community physician-teachers. *Academic Medicine, 76*(2), 184 – 87.

Whitehead, C. (2007). The doctor dilemma in interprofessional education and care: How and why will physicians collaborate? *Medical Education 41*(10) , 1010–1016.

Williams, R. L., Reid, S. J., Myeni, C., Pitt, L., & Solarsch, G. (1999). Practical skills and valued community outcomes: The next step in community-based education. *Medical Education, 33,* 730 -737.

Worely, P. & Kitto, P. (2001). Hypothetical model of the financial impact of student attachments on rural general practices. *Rural and Remote Health, 1*(83). Retrieved May 10, 2007 from the Rural and Remote Health database.

Worley, P., Prideaux, D., Strasser, R., Silagy, C., & Magarey, J. (2000). Why we should teach undergraduate medical students in rural communities. *The Medical Journal of Australia, 172*(19), 615-617.

Worely, P., Silagy, C., Prideaux, D., Newble, D., & Jones, A. (2000). The parallel rural community curriculum: An integrated clinical curriculum based in rural general practice. *Medical Education, 34,* 558 – 565.

Appendix I

Survey of Physician-Teacher Perceptions of Undergraduate Medical Students' Four Week ICE

1. Checking "YES" below indicates that: - I have read and understood the information letter for this study - I agree to participate - I understand the potential risks and/or benefits - I am a volunteer and can withdraw from the study at any time. - The data I provide will be stored at NOSM for 7 years - I understand that aggregated research findings will be available to me via email, upon request - I will remain anonymous in any publication or public presentation of research findings. Do you consent?

	Response Percent	Response Count
Yes	100.0%	45
No	0.0%	0
answered question		45
skipped question		0

2. How many 2nd year NOSM students were placed with you for a 4-week rural integrated community experience in NOVEMBER 2007?

	Response Percent	Response Count
0	4.5%	2
1	15.9%	7
2	75.0%	33
3	0.0%	0
4	4.5%	2
5 or more	0.0%	0
answered question		44
skipped question		1

3. How many 2nd year NOSM students were placed with you PRIOR TO November 2007

	Response Percent	Response Count
0	15.9%	7
1	2.3%	1
2	29.5%	13
3	6.8%	3
4	38.6%	17
5 or more	6.8%	3
answered question		44
skipped question		1

4. How many UNDERGRADUATES from OTHER medical schools (including McMaster and Ottawa Northern Programs) were placed with you in November 2007?

	Response Percent	Response Count
0	81.4%	35
1	14.0%	6
2	2.3%	1
3	0.0%	0
4	0.0%	0
5 or more	2.3%	1
answered question		43
skipped question		2

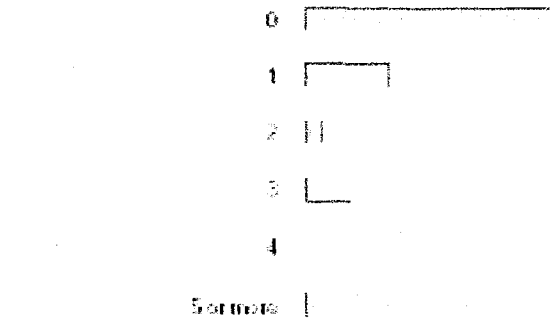
5. How many UNDERGRADUATES from OTHER medical schools were placed with you PRIOR TO November 2007?

	Response Percent	Response Count
0	25.0%	11
1	4.7%	2
2	2.3%	1
3	9.3%	4
4	4.7%	2
5 or more	53.5%	23
answered question		43
skipped question		2

6. How many RESIDENTS from OTHER medical schools were placed with you in November 2007?

	Response Percent	Response Count
0	75.0%	33
1	22.7%	10
2	0.0%	0
3	2.3%	1
4	0.0%	0
5 or more	0.0%	0
answered question		44
skipped question		1

7. How many RESIDENTS from OTHER medical schools were placed with you PRIOR TO November 2007?



	Response Percent	Response Count
0	41.9%	18
1	14.0%	6
2	2.3%	1
3	7.0%	3
4	0.0%	0
5 or more	34.9%	15
answered question		43
skipped question		2

8. What was the impact of the 2nd year NOSM student(s) during the 4-week integrated rural community experience in November 2007 on...

	large negative impact	small negative impact	no impact	small positive impact	large positive impact	N/A	Rating Average	Response Count
professional aspects of your practice practice (e.g., office operation, patient care, your relations with colleagues, you professional goals)	0.0% (0)	11.4% (5)	27.3% (12)	36.4% (16)	22.7% (10)	2.3% (1)	3.72	44
productivity of your practice (e.g., workload, income)	9.1% (4)	61.4% (27)	27.3% (12)	0.0% (0)	0.0% (0)	2.3% (1)	2.19	44
						Other (please specify)		0
						answered question		44
						skipped question		1

9. What was the impact of the NOSM student(s) relative to your expectations prior to the November 2007 placement?

	less positive than I expected	about as positive as I expected	more positive than I expected	Response Count
impact of NOSM student on professional aspects of my practice	0.0% (0)	84.1% (37)	15.9% (7)	44
impact of NOSM student on the productivity of my practice	6.8% (3)	93.2% (41)	0.0% (0)	44
			answered question	44
			skipped question	1

10. Was the COMMUNITY PARTICIPATION of the 2nd year NOSM student(s) during the 4-week integrated rural community experience in November 2007 different than non-NOSM students?

	NOSM student(s) participated LESS than non-NOSM students	NOSM student(s) participated ABOUT THE SAME as non-NOSM students	NOSM student(s) participated MORE than non-NOSM students	N/A	Rating Average	Response Count
participation in community level health care (e.g., advocacy, teaching, public speaking)	4.7% (2)	37.2% (16)	20.9% (9)	37.2% (16)	2.26	43
working with community health professionals (e.g., nurses, midwives, pharmacists)	0.0% (0)	41.9% (18)	34.9% (15)	23.3% (10)	2.45	43
participation in community life (e.g., participation in social or cultural activities)	11.6% (5)	44.2% (19)	16.3% (7)	27.9% (12)	2.06	43
					Comments	4
					answered question	43
					skipped question	2

11. Given their stage of development as physicians, how did the 2nd year NOSM medical student(s) do on the following selected areas related to the NOSM curriculum?

	less positive than I expected	about as positive as I expected	more positive than I expected	Response Count
knowledge of issues related to rural and northern health	0.0% (0)	78.6% (33)	21.4% (9)	42
preparedness for isolation of rural context	2.4% (1)	69.0% (29)	28.6% (12)	42
patient centered approach to health care	0.0% (0)	78.6% (33)	21.4% (9)	42
community centered approach to health care	0.0% (0)	83.3% (35)	16.7% (7)	42
			answered question	42
			skipped question	3

12. Describe the difference in performance between the 2nd year NOSM student(s) and students from medical schools where there is relatively less focus on Northern and Rural Health?

	Response Count
	22
answered question	22
skipped question	23

13. Please comment regarding any aspect of the 2nd year NOSM student placement that was not addressed in this questionnaire.

	Response Count
	7
answered question	7
skipped question	38

14. Thank you very much for your time. Would you be willing to participate in a short telephone interview to follow-up on the information collected from this survey?

	Response Percent	Response Count
Yes	37.2%	16
No	51.2%	22
I don't know	11.6%	5
answered question		43
skipped question		2

15. If you are willing to participate in a short interview, please enter your contact information below.

	Response Count
	18
answered question	18
skipped question	27

Appendix II

Dear Physician-Teacher:

RE: Survey of Physician-Teacher Perceptions of Undergraduate Medical Students' Four-Week ICE

Introduction and Invitation to Participate

We recognize how important your views are as someone who has so generously given of your valuable time to provide clinical teaching. Please complete a short survey to determine physician perception of the impact of NOSM 2nd year students.

This information will be used by Marsha Reinikka for her M.Ed. thesis at Lakehead University. The thesis is entitled 'Physician-Teacher Perceptions of Undergraduate Medical Students' Four-week Integrated Community Experience (ICE)'.

Your participation in this study is voluntary, you may refuse to participate in any part of the study, and you may withdraw from the study at any time. You may decline to answer any questions on the online questionnaire or interview.

This online questionnaire will take approximately five minutes of your time. Should you opt for a follow-up telephone interview; the interview will take no more than 30 minutes. Your explicit consent will be sought to audio-record the interview. There are no foreseeable risks or harms associated with this study. The study may benefit Northern physicians in understanding the impact of NOSM students on physician-teacher practice and the community.

Access to the data will be limited to M.Ed. student Marsha Reinikka and her M.Ed. supervisor, Dr. Christina van Barneveld of the Faculty of Education, Lakehead University. The information you share will be coded with a number, and your name will not be directly associated with your response in the database. Results of the study will be disseminated in aggregated form and may be published in academic or professional journals. Individual participants will not be identified without their explicit consent. The data will be stored in a secure server in NOSM for seven years.

Aggregated results will be emailed to participating physician-teachers upon request. If you have any questions, please to do not hesitate to call Marsha Reinikka at (807) 345-0048 or the thesis supervisor Dr. C. van Barneveld, Faculty of Education 807-343-8330 or the Lakehead University Senate Research Ethics Board at 343-8283 for information or assistance.

Yours in education:

Dr. Roger Strasser
Founding Dean
Northern Ontario School of Medicine

Dr. Joel Lanphear
Associate Dean, Undergraduate Medical Education
Northern Ontario School of Medicine

Appendix III

CONSENT FORM

Please sign and date this consent form, a requirement for the Lakehead University Research Ethics Board.

I have read and understood the information letter for the study "Physician-teacher Perception of Undergraduate Student Impact on Practice, Performance, and Community". I agree to participate in this study and am aware of the potential risks/benefits of the study and what those are. There are no known risks for this study.

I understand this study is voluntary and I can withdraw at any time. I also understand the data will be stored at a secure server at the Northern Ontario Medical School for a period of seven years. I understand the survey results will be emailed to me upon completion, for my information.

I understand that I will remain anonymous in any publication/presentation of the research findings.

_____ _____

Signature Date

Appendix IV

Office of Research

Tel (807) 343-8283
Fax (807) 346-7749

December 4, 2007

Ms. Marsha Reinikka
Faculty of Education
Lakehead University
955 Oliver Road
Thunder Bay, Ontario P7B 5E1

Dear Ms. Reinikka:

Re: **REB Project #: 038 07-08**
Granting Agency name: N/A
Granting Agency Project #: N/A

On the recommendation of the Research Ethics Board, I am pleased to grant ethical approval to your research project entitled, "Physician-Teacher Perceptions of Undergraduate Medical Students' Four-week Integrated Community Experience".

Ethics approval is valid until **December 4, 2008**. Please submit a Request for Renewal form to the Office of Research by November 4, 2008 if your research involving human subjects will continue for longer than one year. A Final Report must be submitted promptly upon completion of the project. Research Ethics Board forms are available at:

During the course of the study, any modifications to the protocol or forms must not be initiated without prior written approval from the REB. You must promptly notify the REB of any adverse events that may occur.

Completed reports and correspondence may be directed to:

Research Ethics Board
c/o Office of Research
Lakehead University
955 Oliver Road
Thunder Bay, ON P7B 5E1
Fax: (807) 346-7749

Best wishes for a successful research project.

Sincerely,

Dr. Richard Maundrell
Chair, Research Ethics Board

/len

cc: Dr. Christina van Barneveld, Supervisor, Faculty of Education
Faculty of Graduate Studies
Office of Research

Appendix V

Complete List of Quotations from Physician-teacher Interviews

Student Impact on Physician-Teacher Practice

What do physician-teachers describe as the impact of the NOSM students on their practice?

Impact of medical students on productivity of the physician-teacher practice

No Impact

"See the same number of patients." (Physician-teacher 1)

Fewer Patients

"I don't think it was particularly with the NOSM students. I think all students do. When you have them in, they just slow you down. You can't see as many patients because when you're going in to a patient consult and you're on your own, you just go click, click, click, click, click and with the students – you have to stop and explain why you're doing what you're doing." (Physician-teacher 2)

"Time to see the students after a patient interview is longer – this reduces work flow" (Physician-teacher 3)

"The number of patients I see – or that we're able to see – so when I look at my day: are the patients waiting long? are there delayed times? - when I have students compared to when I don't have students and overall they don't have a negative impact at all – or minimal with regards to patients waiting longer. Small impact would be in the minimal, minimal because there is still a bit of a delay, but it is still an acceptable delay; certainly not in the realm of unacceptable." (Physician-teacher 4)

"When the students are here, to allow for adequate teaching time – because I like to discuss the salient points of each case with them while they're actually fresh - at that point, my ability to take patients drops to 1 every 30 minutes – no more than that." (Physician-teacher 5)

"You have to spend more time with the students both in terms of going over explaining the situation, explaining your thought

process, your decision making as to why you're selecting this drug, how do you make the diagnosis, what do you rule out in terms of a differential diagnosis, how you summarize this, how do you analyze the pros and cons of different diagnosis and different points of view, how do you become patient-centred, asking the patient how they were feeling about the situation – what their ideas are in terms of their condition affecting their function, and what their expectations were." (Physician-teacher 6)

"Decreased the number of patients I could see in a day and changed my patient flow. In order to teach the students we have to allow them adequate time to examine the patients with significant findings. It just slowed my practice down" (Physician-teacher 7)

"We're actually seeing one less patient per clinic, so that we're able to do some clinical review." (Physician-teacher 8)

"It just takes extra time to review things with them." (Physician-teacher 9)

"We were always running behind and people were waiting too long – so I just decided to book much more lightly." (Physician-teacher 10)

Impact of medical students on professional aspects of the physician-teachers' practice

No Impact

"The interaction with the patients is essentially the same – you just have to explain the stuff to the student as you're going." (Physician-teacher 2)

Positive Impact

They Keep Us Up-to-Date

"The questions that they ask sometimes we have to think, reconsider, why we're doing something in a certain way and they inspire me to look up things that I hadn't, that I wouldn't otherwise be investigating." (Physician-teacher 1)

"It was very positive. They force you to review material so you can demonstrate your treatment plan is correct. It keeps you on your toes. It's a positive environment. Students bring state-of-the-art practices and treatment plans; this helps you to up-date your practice. They may suggest new ideas or methods." (Physician-teacher 3)

"Having the students requires you to focus on the precision of the examination as well as the precision of the history and physical. As a result of their learning standardized approaches, it makes me go back to the recognized text and make sure that I'm solid - for example, on the muscle-skeletal examination or psychiatric interviews– that kind of thing. As well, because of the inquiries that the students have, it forces you to go back and make sure that you're up to date, that your evidence is solid, that you're doing exactly the right thing. " (Physician-teacher 5)

"You're always challenged to kind of make sure you know what you're talking about. So, from a professional perspective, I think the implication is that you're more apt to look things up – and they are up on some of the recent things which is helpful for us - and it's also an opportunity for us to practice our own refreshing of our clinical skills." (Physician-teacher 8)

Changes the Atmosphere

"I think they have a positive impact on the professional atmosphere in that it changes the dynamics in the clinic, in that patients now have to see a learner. I just think it sets things up in a very positive light – certainly in our town. Patients like seeing learners here. I don't think any learner has ever been denied seeing any patients. The community members here appreciate the learners. I think it has had a positive impact on our profession. What we hope to achieve is: 1. we hope that they would have a positive experience here, and 2. that it would be a positive experience for the staff that work in the clinic and organization. Based on those two parameters – we are meeting expectations." (Physician-teacher 4)

"The students obviously ask questions which often are similar to questions the patients might ask and so therefore you spend more time answering those questions in front of the patients; so, therefore, the patient also becomes better informed." (Physician-teacher 6)

"The staff and patients really enjoyed it. They like to see different people around here. It's interesting to see the students. They keep the pressure on you to keep current." (Physician-teacher 9)

"I think it gives us variety in what we're doing. You know how we get a little complacent sometimes and just having the students around asking questions it makes me actually go

> and read stuff more. You know – to be able to answer their questions reasonably. It's just stimulating all around in terms of the questions that need to be answered and how we do things and how we explain." (Physician-teacher 10)

Expectations based on past experience

> "Based on my experience in the past – with other medical students from elsewhere." (Physician-teacher 1)
>
> "Yeah, because on previous rotations they were just here because they had to be and they said that; so my expectations for incoming students were pretty doubtful." (Physician-teacher 4)
>
> "Based on the other students." (Physician-teacher 5)
>
> "I've been doing this for 30 years, so I think my expectations are fairly realistic." (Physician-teacher 6)
>
> "We have learners in our practice. I've worked with learners in different stages of training – medical students, residents, nurse practitioners – and so what I would expect is that the student would go in and take the time to do a history – do the part of the physical exam that they're comfortable with, and essentially that's what my expectations would be for a student at this level of training - and I would say for the most part that's what I experienced." (Physician-teacher 8)
>
> "My experience with previous students – they come in keen and provide interesting and challenging opportunities for me to teach." (Physician-teacher 9)
>
> "We have had primarily what would be called clerkship students from other universities which would be more advanced – so we just figured they would be a little bit less advanced than those students would be." (Physician-teacher 10)

Expectations based on understanding of NOSM curriculum and admissions policy

> "I was expecting them to be bright and engaged and part of that was knowing the previous NOSM students – what their levels had been at – and part of it was having... participated in medical resident interviews before – and seeing CV's that people were presenting – so we do tend to have high expectations." (Physician-teacher 1)
>
> "I expected them to be up on and into it – because of the design of the curriculum and because I would have expected the people who were going to go to NOSM would have been attuned to that kind of emphasis." (Physician-teacher 5)

"Well, you know I was quite familiar with what the curriculum was like and the emphasis used on their admissions criterion – so I had a pretty good understanding where they were coming from ... they had to be indicating from their admissions criterion that they were quite interested in rural (practice) and rural benefits so – I think they met my expectations." (Physician-teacher 10)

Expectations based on past experience

"Based on my experience in the past – with other medical students from elsewhere." (Physician-teacher 1)

"Yeah, because on previous rotations they were just here because they had to be and they said that; so my expectations for incoming students were pretty doubtful." (Physician-teacher 4)

"Based on the other students." (Physician-teacher 5)

"I've been doing this for 30 years, so I think my expectations are fairly realistic." (Physician-teacher 6)

"We have learners in our practice. I've worked with learners in different stages of training – medical students, residents, nurse practitioners – and so what I would expect is that the student would go in and take the time to do a history – do the part of the physical exam that they're comfortable with, and essentially that's what my expectations would be for a student at this level of training - and I would say for the most part that's what I experienced." (Physician-teacher 8)

"My experience with previous students – they come in keen and provide interesting and challenging opportunities for me to teach." (Physician-teacher 9)

"We have had primarily what would be called clerkship students from other universities which would be more advanced – so we just figured they would be a little bit less advanced than those students would be." (Physician-teacher 10)

Expectations based on understanding of NOSM curriculum and admissions policy

"I was expecting them to be bright and engaged and part of that was knowing the previous NOSM students – what their levels had been at – and part of it was having... participated in medical resident interviews before – and seeing CV's that people were presenting – so we do tend to have high expectations." (Physician-teacher 1)

"I expected them to be up on and into it – because of the design of the curriculum and because I would have expected the people who were

going to go to NOSM would have been attuned to that kind of emphasis." (Physician-teacher 5)

"Well, you know I was quite familiar with what the curriculum was like and the emphasis used on their admissions criterion – so I had a pretty good understanding where they were coming from ... they had to be indicating from their admissions criterion that they were quite interested in rural (practice) and rural benefits so – I think they met my expectations." (Physician-teacher 10)

Student Participation and Experience in the Community

What do physician-teachers describe as the community participation of NOSM students?

Participation Level

More

"The last students that we had did an exceptional job of being self-directed -seeking unique opportunities for healthy interaction with the community. Some examples I can give are: just simple things such as within the organization, going to the kitchen talking to the staff, having lunch with them, most staff take for granted that that's not something that's ever been done – secondly – outside of the organization they have gone to different bazaars, bake sales, bingo. They just did really well at integrating with the community. One of the things that I try to do is extend an invitation for the learners to use the local gym and swimming pool. They actually get a letter from the Mayor and things like that and they get free passes while they're here – and the students last time took advantage of that. The other thing – one of the main employers in town is the saw-mill and we offered them a tour of the saw-mill just to make them aware of where most of the men in town work at – and they took off to the idea. We arranged for a tour of the saw-mill. They came out with hard hats on – real troopers – getting out there learning. So I really felt that they truly got an enriched experience in the community part, which I think is so vital and in 110 they really didn't take advantage of opportunities. You know they go to the bingo and they met people there they sat with and the next day those people were patients. So right away the dynamics were changed and because they've had the increased interaction, obviously, it was a positive experience – they knew them from a social setting." (Physician-teacher 4)

"The thing that was mostly different was their getting involved with the community - they attended meetings, dinners, that kind of thing." (Physician-teacher 5)

"I found they were very eager. I thought they participated more than I expected - they stayed afterwards, they came in early, they went to rounds, they saw in-patients – so in that sense they participated more." (Physician-teacher 7)

"The consistency of the students coming, i.e. knowing that we're expecting four students per year, is an important piece I think both for our practice and for the community." (Physician-teacher 8)

"Our community is opening up more to them because we're getting more familiar with having students around. So I think the increased number of students is a benefit because it's becoming more of a routine for the community, as well for the hospital employees and community and for the physician community. So just having a regular flow of students is beneficial to both sides. The electives may be very sporadic, maybe once every two years. Knowing we're going to have students in November and February – people get geared up a little more and the hospital - more interested." (Physician-teacher 10)

Less

"When the students are on elective rotations, they're not facing immediate examination. They often seem to feel less of a time pressure that they can take advantage of some of the cultural activities that are going on. Whereas when the NOSM students are here, because of the nature of their rotation, their various commitments, they tend to spend more time studying." (Physician-teacher 1)

"I would say that they still did not get out into the community and access the community for what it has to offer – in terms of the social life. They did not visit the museum, they did not go to the city club, they did not go to the complex. I don't know that they got out and did any cross-country skiing or any down hill skiing, or snowmobiling. So, in terms of the social life, in terms of experiencing what the community has to offer, they didn't seem to do that. "(Physician-teacher 6)

"There isn't much social or cultural activities in _____." (Physician-teacher 7)

About the same

"We had another medical student at the same time – overlapping by a good chunk of it – so that some of the things they participated in were identical; some were different." (Physician-teacher 1)

"We treat them all the same and I think that rather than it being a school thing – it's an individual thing. Some students are more up to taking you up on your offers than others." (Physician-teacher 2)

"I think that's very student-dependent." (Physician-teacher 8)

"They did the same things; others went out as well." (Physician-teacher 9)

"In terms of just being aware of recreational events in the community and just being involved in normal community events, it was about the same." (Physician-teacher 10)

Scheduled activities with other health professionals

Positive

"They have community-based learning experiences built in. So it's a fundamental part of the experiences out in the community. The other students that we had didn't have anything built into their time here and they didn't make any effort to go out into the community and see what was happening." (Physician-teacher 2)

"They have an established schedule that forces them to participate in community activities. Other schools don't have that time scheduled in. It makes a difference. They went in the bush with the loggers to observe the safety procedures the loggers use. It gives them an idea of what they may encounter in their practice and how injuries may occur. They went to patient homes with the community care access programs and participated in the diabetes education centre seeing patients. Other schools don't schedule these type of activities." (Physician-teacher 3)

"The community placement that was built into the curriculum was certainly much more involved than other medical students. That was a result of the program." (Physician-teacher 6)

"Yes, the other elective students we had didn't have any formal placements in other community agencies, so there was a difference for these students." (Physician-teacher 10)

Negative

"Community sessions, where they were going to home care or public health or any of those kinds of things, were rated less useful by the students and I think it's because of the decreased amount of actual person contact they had and more sort of following or watching." (Physician-teacher 5)

"They weren't terribly interested in the community care access session that they have; so the students weren't quite as happy with those set ups." (Physician-teacher 6)

"I was not convinced that was necessarily a really useful endeavour. That's my bias on it. I don't know how much they learned by going out to CCAC. Going out to the Diabetes education centre, I think was very useful. CCAC, I don't find it useful – I don't know how much they get from it." (Physician-teacher 7)

Student Performance on Areas Related to the NOSM Curriculum

Given their stage of development as physicians, how did the second-year NOSM medical students do on the following areas related to the NOSM curriculum?

More knowledge of aboriginal issues

"Family structures in native communities are often different. Women often have multiple partners and sometimes that's an issue that people find something derogatory about it. I think the students that we had, had an understanding of how this may happen in the native community. Also, they had a better understanding of how some first nation cultures view death and dying. They realized when they came in, that they actually do these things differently – which was good." (Physician-teacher 2)

"They did have the aboriginal rotation and they did that together and they reported they had a positive experience with that rotation. So I think they had a positive rotation there. Certainly, they were more open. It wasn't a distracter, thinking that this could be a difficult rotation. It certainly seemed they were open-minded and welcoming to working rural." (Physician-teacher 4)

"On aboriginal issues – their knowledge was better – perhaps that was due to their experience and background." (Physician-teacher 9)

"There was probably a little more attention to an understanding of the cultural differences in our community." (Physician-teacher 10)

Better performance on northern and rural health topics

"They would have a particular interest in rural and northern medicine attributes and we found that to be true." (Physician-teacher 1)

"Well, I knew that they had specific lectures and experiences focused on these kind of issues, so I expected them to more up on that stuff than students from other programs, and they were. My expectation was they

would be better, have more knowledge and awareness of those issues, and they did." (Physician-teacher 2)

"The skills they learn in their curriculum that relate to interviewing are linked. They see how systems interact early in their training; they are further ahead. The other students catch up, but the NOSM students had a more broad knowledge, earlier. They have more patient exposure in their curriculum; they are better at interviewing skills; they have a system; they approach problems in a more organized, less scattered way; they give concise explanations of the problem and a treatment plan. Other students only list the problems and don't seem to have a plan. (NOSM students) can sort the information into a treatment plan." (Physician-teacher 3)

"A basic expectation that I have for students coming in is that they want to be here. They want to be here and they want to get what they can out of the community. The two ladies that were here last time were from urban backgrounds. You know, to be open minded, to really get a good sense of rural living and a really good insight into how important it is and they did that last time. You know they were very open-minded and took suggestions and made the best of the opportunities." (Physician-teacher 4)

"(Their) knowledge of a small town and how it works, I think, is probably better than students from other medical schools from southern Ontario." (Physician-teacher 6)

"The aim of the curriculum is to get them involved, certainly, early in the program in terms of learning new skills, learning how to do things. So, I would say that the NOSM program is a success in that aspect." (Physician-teacher 6)

"They understood the increased responsibility of a primary care practitioner in rural areas, compared to an urban centre such as any major centre such as Toronto or Barrie, and the concept that you manage more than just medicine. But the patient logistics and ensuring adequate care and the care of a primary practitioner in a rural centre involves more hands-on management of a patient, other than telephone consultation with a specialist and generally more procedures for managed primary care in a rural setting." (Physician-teacher 7)

"I'm aware of what the principles and philosophies of NOSM are in terms of promoting from the north, working in the north, and being aware of smaller rural communities." (Physician-teacher 8)

"They were very keen to learn and to ensure that they fully comprehended their findings and the significance of those positive findings. They were very quick at adapting." (Physician-teacher 7)

Impact of Background and Experience on the Students

Being from a rural area

Positive difference

> "The ones that are more rural are less disturbed by working and living in a small place, not so flustered by the idea of encountering their patients in the grocery store, less stressed by the rotation in some ways." (Physician-teacher 1)

> "They know how to survive – what's available. They're more comfortable – a level of outdoor interest increases their comfort." (Physician-teacher 3)

> "They're in tune to the area because this is where they're from. Do they approach it fundamentally differently than somebody from Scriberia? I would hope so." (Physician-teacher 5)

> "I know the residents that I've had from Southern Ontario were definitely less attuned that the students from NOSM." (Physician-teacher 5)

> "Students from small communities who have had contact with health care providers and health care in general, being from a small community, would be much more aware of the intimate details of what it's like to be in a small community and to practice in a small community." (Physician-teacher 8)

Negative difference

> "I think that was taken for granted and they didn't go out of their way to see what this particular town had to offer." (Physician-teacher 6)

The impact of a different undergrad requirement

Positive Impact

> "I think, philosophically, that bringing people in from different backgrounds usually makes them better rounded, so that they're better all-round individuals. They're also bright enough that they're able to catch up on scientific issues; so, I think having people from different backgrounds is a good idea. It'll help them in the long run – so they don't just focus on the job – which I think is a detrimental thing with medical people." (Physician-teacher 2)

> "There was a world of difference, one was a nurse, so in terms of medical aspects and taking a history – that sort of thing – she did

very well. The other student was a lawyer and was interested in informed consent, power of attorney – that sort of thing. When I was demonstrating geriatrics, they tended to concentrate and excel in areas of their past." (Physician-teacher 6)

"I found they were more knowledgeable, more accomplished about medicine theory in general, than other second-year students. I don't know if that's due to the curriculum or whether it's a reflection on students' previous background experience. I know one was a previous emerg nurse before she went to medicine – my last batch of students. I found their breadth of knowledge exceeded my expectations for second-year students." (Physician-teacher 7)

"I had one student with a nursing background which helped – the older ones seemed to be able to have a better understanding and to be wiser." (Physician-teacher 9)

"I think probably because they've all been selected in some way from people that are interested in the first place with rural medicine." (Physician-teacher 10)

Depends on the individual

"They were pretty much like anybody else." (Physician-teacher 5)

"They kind of continued initially in the interviews to be more of a nursing approach. So, I found it was a little more challenging to bring them around a little bit to say well – maybe we can do this, or maybe we can ask these questions – even though their background knowledge was excellent and their motivation was excellent – they were sort of still in that nursing mode." (Physician-teacher 10)

Impact of the Responsibility of Curriculum and Exams

Impacted Students Negatively

"It just changes their experience in the community." (Physician-teacher 1)

"It seems that, as opposed to learning for the sake of learning and learning about a community and that sort of thing, they were focusing on passing this exam." (Physician-teacher 6)

"It seemed like there were times that they were involved in studying for exams. Writing exams may detract from continuous hands-on experience while they were in the rural setting. For example, I would have them Monday and Thursday and they weren't able to come because 1. They were with other practitioners, or 2. They had something else – they had an exam coming or study break." (Physician-teacher 7)

"Yes, the other students were always around – not in class or studying curriculum – so we got to know them more. They see fewer patients than the ones here on electives; so they have less exposure to disease. It has a negative impact in that it tends to focus on one particular system i.e. urology." (Physician-teacher 9)

Understood to be a fact of life

"Well there were times when they weren't in the clinic, they couldn't be in the clinic. So they have missed some experiences that may have been helpful and useful to them. That was the only impact I could see. The academic responsibilities are just a fact of life for those students." (Physician-teacher 2)

"Exams take away from the community experience, but students blend both responsibilities very well and did both." (Physician-teacher 3)

"I put up as an expectation that the opportunities were here if they wanted to take advantage of them and to get to know the community and to see people in the clinic and the emergency room and things like that. I did realize that they had more core clinical curricula obligations as well, but I put the onus on them to communicate to me how best to have a balance between the two and when I said that up front, they made a study schedule around the clinic time. I think it is a little distracting. The way the rotation is set up is a little different from what we've experienced in our programs, but I think it's doable." (Physician-teacher 4)

"My expectation was that it is essentially an academic year." (Physician-teacher 5)

"It was very student-dependent. Of the six NOSM students who came through, there was an impact on one. The others, I would say, did not feel there was an impact. There was a reasonable balance. They were very excited to do the clinical component. The other student was very involved with the extra curricular, the political things, which had to do with research for meetings. So I would have to say that would have had an impact on that student. Time in the community limited them more than curriculum and exams." (Physician-teacher 8)

"We were quite well aware that they had requirements for study times and exams and other times for teleconferences and things that they were required to do and it just seemed to be part of the program. Once they got into their second or third week here they were very interested in attending all the clinical things – less interested in doing their clerical or exam work – but they certainly understand that that was part of the participation." (Physician-teacher 10)

"NOSM students may not be quite as dedicated or as hard working, maybe, perhaps a little more cocky" (Physician-teacher 6).

"I had a much better experience than I've had in the past with other students generally. I was actually debating whether I would continue at one point. In my practice, they were particularly enthusiastic. I just feel that as a preceptor we're giving up our time and they really appreciated it and worked hard. They were excellent. It was an extremely positive experience from my perspective." (Physician-teacher 7)