

PRELIMINARY FINDINGS OF ASSESSING NOSM'S SOCIAL ACCOUNTABILITY
TOWARD NORTHERN & RURAL FRANCOPHONE COMMUNITIES

by

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ABSTRACT

The Northern Ontario School of Medicine (NOSM) was founded in 2003 with a specific mandate to improve the health of the people and communities of Northern Ontario. The objective of this project was to determine whether NOSM was remaining socially accountable to the healthcare needs of Francophones in Northern Ontario by: (i) graduating physicians capable of offering French language services, and (ii) identifying whether these physicians are locating their practice in areas of greatest need for such services. Specifically, if NOSM learners' who reported having French as a language of competence at entry to, and exit from, medical school located their practices in areas densely populated by Francophones in Northern Ontario. To do so, three data sources were utilized; a) the Centre for Rural and Northern Health Research Tracking Study data of NOSM learners; b) the College of Physicians and Surgeons of Ontario (CPSO) public "Find a Doctor" search; and c) the 2016 Statistics Canada Census data. Laurentian University Research Ethics Board approval was obtained for this project. In this project, I found that 39% and 38% of learners identified French competency in the entry and exit tracking survey respectively. Of the French respondents identified in the tracking surveys, 20% and 21% identified French competency in practice (CPSO registry). A total of 70% of NOSM French-competent graduates were currently practising in a Francophone community in Ontario (i.e., total population having $\geq 10\%$ of Francophones), with $\sim 92\%$ of French-competent respondents having located their practice in a French community in the north (having a postal code beginning with P). These preliminary results suggest that NOSM is achieving its mission of social accountability towards Francophones in northern Ontario and more specifically, that NOSM is helping to improving the availability of French language medical services for Francophones in Ontario.

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1.0 INTRODUCTION

The Northern Ontario School of Medicine (NOSM) was established in 2003 with the goal of improving the health of the people and communities of northern Ontario. Before opening its doors, NOSM established a mission statement which included being socially accountable to the needs and the diversity of the populations of northern Ontario¹ and adhering to the World Health Organization's (WHO) definition of Social Accountability of Medical Schools.¹ Today, NOSM aims to address the cultural diversity and needs of the region it serves² and accomplishes this by "actively engaging Francophone, Indigenous and underserved communities in northern and rural Ontario."³ More specifically, the school's mission is to "increase the number of physicians and health professionals with the leadership, knowledge and skills to practice in northern Ontario".^{3,4} As such, the school's approach to achieving their mandate is based on implementing northern training initiatives and admitting learners' of similar demographics to that of the north in the hopes that this will result in medical school graduates with a greater likelihood of practicing in northern Ontario.^{5,6,7}

Northern Ontario faces unique challenges. The population is sparsely distributed across a large area, making it more difficult to access a range of medical services.⁸ Additionally, the socio-demographics of the population are particularly diverse when compared to the province.⁹ The Northeast and Northwest Local Health Integration Networks (LHIN) defines northern Ontario as being home to approximately 780,140 citizens and covering a geographic region of nearly 800,000km²,⁹ thus, representing 87% of Ontario's land area but home to only 6% of its population.^{8,10} From a geographic standpoint NOSM's service region differs slightly to that of the northern LHINs. NOSM's original boundaries were based on Ontario's District Health Councils definition in 2003, the service region's boundaries happen to coincide with current Census

Divisions. NOSM service region is defined by the Statistics Canada Census Divisions of Algoma, Greater Sudbury, Kenora, Manitoulin, Muskoka, Parry Sound, Rainy River, Sudbury, Temiskaming, and Thunder Bay. In addition, to that of the Northeast and Northwest LHIN boundaries, NOSM also uses the northern part of the North Simcoe Muskoka LHIN.¹¹ Therefore, NOSM's service region includes 859,994 citizens over a geographic region of 802,725km².^{10, 11}

According to the Office of French Language Services of Ontario, nearly 5% (n=611 500) of the total population in Ontario is considered Francophone.¹² As such, Ontario is home to the largest population of Francophones in Canada outside of Quebec.¹³ Of relevance to this project, northern Ontario represents approximately 23% of all French-speaking citizens in Ontario, thus the proportion of Francophone residents is substantially greater in the north than in the province as a whole.¹²

According to the Northeast and Northwest LHINs, northern Ontarians also have poorer health status, as well as lower use of medical care services than the rest of Ontario.^{14,15} Furthermore, studies have suggested that Francophones have relatively poorer health than the general population, with a lack of access to French language healthcare services listed as among the possible reasons.^{16,17,18} This highlights the importance of French language health care services for Francophones in northern Ontario.

The objective of this major paper is to provide preliminary evidence of whether NOSM is remaining socially accountable to Francophones in northern Ontario by: (i) producing physicians capable of offering French language services, and (ii) identifying whether these physicians are locating their practice in areas of greatest need for such services. These objectives will be addressed by using the Centre for Rural and Northern Health Research (CRaNHR) tracking study of NOSM medical learners' and residents to: 1) assess the self-reported language competence

survey responses among NOSM undergraduate (UG) learners' at entrance to the medical school through to independent practice; 2) assess at exit of NOSM UG to independent practice; and 3) determine if French-speaking NOSM graduates establish their practices in areas densely populated by Francophones in northern Ontario.

2.0 LITERATURE REVIEW

2.1 Northern and Rural Health Status

Northern Ontarians have a lower life expectancy, at 79 years or 2.5 years less than the total Ontario average.¹⁹ Additionally, mortality and morbidity in northern and rural Ontario are higher than the provincial rates.^{13, 14} Health Quality Ontario reports that “northern regions lag behind provincial averages in quality of health and health care. With approximately 800,000 people living in northern Ontario, northerners are more likely to have worse health, poorer access to health care, and die earlier than people in other parts of Ontario.” (p.12)¹⁹ Population projections also show that northern Ontario’s population is aging more rapidly than that of Ontario as a whole.²⁰ Age does not automatically mean ill health or disability, however the risk of both does increase as one gets older.^{8, 21}

Furthermore, northern Ontarians are a unique subsample of the provincial population as they exhibit poorer health status and riskier health behaviours when compared to southern Ontarians.¹⁹ Statistics Canada used data from the 2013 community health profiles to show that northeastern and northwestern Ontarians have poorer health status across many health indicators including higher rates of obesity, arthritis, diabetes, asthma, high blood pressure and cancer incidences.^{22,23} In addition, the cancer incidence per 100,000 populations in the northeast and northwest are 428.5 and 421.4, compared to Ontario as a whole at 398.8.^{22,23} Northern Ontarians also have higher rates of unhealthy behaviours such as smoking and alcohol consumption and lower rates of fruit and vegetable consumption.^{22,23} The health indicators listed above have been identified as chronic disease risk factors in the 2010 World Health Report.²⁴

Given the risk of poorer health outcomes in northern Ontario, access to quality health care is imperative. Primary health care (PHC) is a term used to refer to the parts of the health care

system with which people primarily interact when health care is needed. It is the “first line of clinical services that provides an entry point into the health care system.” (p.1)²⁵ PHC involves prevention and treatment of common diseases and injuries, basic emergency services, referrals to/coordination with other levels of care (such as hospitals and specialist care), primary mental health care, health promotion and building long-term relationships with patients and families.²⁶ This is a crucial component of health care because it addresses the main health problems in the communities it serves²⁷, and access to PHC is associated with lower rates of illness and greater health equity.²⁸

In Canada, family physicians are the main providers of PHC. They play a role in health promotion, disease prevention, chronic disease management and managing public health emergencies. Therefore, they are integral to the delivery of primary medical services.²⁹ According to the key objectives of the Ontario Ministry of Health and Long-Term Care’s “Patient’s First: Action Plan for Health Care”, improving access and providing faster access to the right care was identified as a priority.³⁰ Thus, the Action Plan outlined that access to a primary care physician for all Ontarians is a priority.³⁰ However, there are problems accessing PHC physicians in many regions of the province. Crooks and Schuurman (2012)⁸ reported that Ontario has two distinct patterns of spatial access to physicians. Specifically, these two patterns are the urban south and the rural north.⁸ The study went on to reveal a pattern of poor spatial access throughout all of northern and rural Ontario. As a result, the northern Ontario population has less access to PHC physicians when compared to southern Ontario. Specifically, distance to PHC resources and funding allocations were identified as likely causes in the poor spatial access.⁸ More recently, in their 2017 annual report, Health Quality Ontario reported that there is unacceptable variation in health care quality and health outcomes by geography, particularly in

the Northeast and Northwest LHIN regions.³¹ The report identified that people in the north are much less likely to report being able to see a PHC provider, such as a family physician (FP), when they are sick.³¹

2.1.1 Access to Services and the Impact on the Health of Francophones in northern Ontario

Franco-Ontarians are a unique population whose settlement in Ontario dates back more than 400 years. In 1986, the French Language Services Act³² was passed by the Legislative Assembly of Ontario and officially came into effect in 1989. The Act enforced Francophones' right to receive government services in French as a matter of law.^{32,33,34,35} Still today, many discussions regarding the health of Francophones have been related to access to French-language PHC services (FLS).³⁴ It is important to understand that not all Francophones in Ontario are completely bilingual and even those who are fully bilingual may benefit from FLS in situations of vulnerability. Therefore, offering FLS to the 611,500⁵ identified Francophones in Ontario is important to providing effective and comprehensive care.¹⁸

Studies have suggested that Francophone communities are likely to be older, less educated and less represented in the workforce.^{36,37} Francophone minorities tend to live in economically disadvantaged areas³⁷ and have relatively poorer health than the general population.³⁷ Comparing the Francophone population to that of Anglophones, Francophones have less access to health services, increased average stress levels, increased chronic illness (i.e., cardiovascular disease, asthma, arthritis), decreased likelihood of reporting excellent health, increased medication usage, increased rates of smoking and drinking alcohol, and increased obesity rates.^{36,37}

Studies have found that health outcomes exist among Francophones with greater numbers of Francophones in northeastern Ontario reporting unhealthy lifestyle behaviours such as alcohol consumption, tobacco consumption, and lower intake of fruits and vegetables, when compared to Anglophones.^{37,38} They also reported that Francophones in this region are less likely to rate their health as “very good” or “excellent.”^{37,38}

Relevant to this major paper, Health Canada released a report by Bowen et al. (2001) that explained how linguistic barriers can have a damaging effect on access to health services, the understanding of, and adherence to treatment plans, the quality of care and the overall satisfaction of available services.³⁴ Patients face significant adverse effects due to language barriers that are not limited to primary care providers but also include access to health promotion/ prevention programs and the first contact with a variety of other health care professionals.³⁴ Such research on language barriers has provided insights as to how these barriers affect patient satisfaction, service utilization and health outcomes.³⁴

Timony et al. (2013) found a maldistribution of French language family physician services in the province of Ontario.³⁹ Furthermore, De Mossaic et al. found that Ontario Francophones “were more likely to actively search for French language services and complain when services were not available. (p.211)”⁴⁰ The Fédération des Communautés Francophones et Acadiennes du Canada (FCFA) found that 47% of Francophones in Ontario have no access at all to an emergency access centre (other than hospital emergency departments) in French; 59% have no or rare access to seniors’ home services in French; 77% have no or rare access to alcohol treatment centres in French; 66% have no or rare access to drug addiction centres in French; 66% have no or rare access to crisis lodging centres in domestic violence cases in French; and lastly 53% have no or rare access to mental health services in French.¹⁸ Such research suggests that the

health of Francophones may be impacted by the lack of health care services available to them. Collectively, these indicators suggest that a lack of access to FLS may play a role in the poorer health outcomes of Francophones and particularly in northern Ontario.

2.2 Physician workforce

Geographical maldistribution of physicians is a problem affecting many rural and northern communities.⁴¹ In order to understand the distribution of physicians we need to understand the regional workforces and patient population. The Canadian Medical Association (CMA) provides annual statistics on Canadian physicians. In 2017, they listed an average of 2.3 physicians per 1,000 people across Canada and indicated that the physician population was comprised of 52% FPs and 48% specialists in other disciplines.⁴² The 2018 CMA Masterfile reported a total of 84,260 physicians in Canada, with 30,175 of them located in Ontario.⁴³ In 2012, Gauthier et al. reported that northern Ontario had approximately 1,366 physicians in total with a physician-to-patient ratio of 1:601,¹⁶ which equates to 1.67 physicians per 1,000 people compared to the provincial ratio of 1:451, or 2.22 physicians per 1,000 people.¹⁶ In addition, less than 8% of physicians practice in rural areas whereas approximately 19% of Canadians live in rural areas.⁴² Disproportionate distribution of the healthcare workforce is a perennial problem. As mentioned earlier, northern Ontario represents 6%¹⁰ of Ontario's total population of 13,448,494⁴⁴, a shortage in healthcare workforce can be quite significant. For instance, in 2002, the Romanow report on the future of Canadian healthcare reported a geographical maldistribution of health care providers, especially physicians.⁴⁵ The report identified a significant variance in access to physicians and specialists across the country. This omnipresent problem as shown in the CMA's yearly demographics

suggests that many regions and communities do not have access to basic health care services and health care providers.⁴⁵

In 2008, a study by Pong et al. reviewed strategies designed to attract physicians to rural and other underserved areas of Ontario.⁴¹ Financial incentives and marketing of a northern and rural lifestyle were used to attract physicians to practice in underserved areas in northern communities, however these strategies were found to be unsuccessful. Specifically, once the financial incentives were no longer available, or the initial appeal of the northern lifestyle was gone, physicians left for the urban south.^{41,46}

In 2010, The Rural and Northern Healthcare Framework was developed to address the needs of rural, remote and northern areas of Ontario.⁴⁷ The framework indicates that “access to quality health care in rural, remote and northern communities is a long standing issue in Ontario. The challenges of providing appropriate access to health care in these communities stem from multiple factors: geographic remoteness, long distances, low population densities, less availability of other providers and inclement weather conditions” (p.6).⁴⁷ The framework clearly states the need for physicians in rural and northern areas. Therefore, knowing that the majority of PHC services in Canada are delivered by FPs,⁴⁸ and that they focus their care on the individual in the context of the family and community.⁴⁹ The studies above have suggested a gap in care when it comes to delivering PHC services to underserved areas in northern communities.^{47, 48}

2.2.1 Francophone Physician Workforce

In order to determine how many physicians in Ontario express a proficiency in providing FLS, Gauthier, Timony and Wenghofer¹⁶ conducted a population based analysis of the 2007 College of Physicians and Surgeons of Ontario Annual Membership Renewal Survey (CPSO-AMRS). The study suggested that there is a promising number of French-speaking physicians,

relative to the number of French-speaking residents in Ontario in terms of absolute numbers, however the problem was the maldistribution of these physicians across Ontario. The study found that there was a ratio of 1 physician per 138 Francophone patients in Ontario. Similarly, there was 1 French-speaking general practitioner (GP) or FP for every 297 Francophones.¹⁶ Most of the French-speaking physicians were located in southern Ontario (91.4%), at a ratio of 1 physician per 111 Francophones.¹⁶ This is compared to northern Ontario's ratio of 1 French-speaking physician per 425 Francophones.¹⁶ With the study above suggesting a misdistribution of French language healthcare services in the province of Ontario, further research by Timony et al. (2013) was conducted to determine if physicians in Ontario who expressed proficiency in providing FLS were located in "Francophone communities". The study concluded that the availability of French-speaking FPs decreased as the number of Francophones in a community increased.³⁹ Given that Ontario is home to the largest population of Francophones in Canada outside of Quebec,¹² that northern Ontario represents such a large proportion of Ontario's Francophones in Ontario, and that there is a misdistribution of French-speaking physicians in Ontario, there is need to strategically supply French language healthcare providers in northern Ontario.

2.3 Importance of French Language Services (FLS)

Physicians in Canada require many competencies to be able to effectively meet the PHC needs of the people they serve. The College of Family Physicians of Canada (CFPC) outlines a competency framework required for the practice of family medicine.⁵¹ The framework is called CanMEDs – Family Medicine and is an adapted version of the Royal College of Physicians and Surgeons of Canada (RCPSC) framework that "aims to create better standards, better physicians and better care".^{50,51} The Family medicine CanMEDs roles outlined are to be a family medicine

medical expert, communicator, collaborator, leader, health advocate, scholar and professional.⁵¹ Of particular relevance to this major paper, is the importance of communication for physicians. As outlined in the CanMEDs framework, communication is a fundamental aspect in a health care setting.

As communicators, FPs/GPs and specialists “form relationships with patients and their families in order to facilitate the gathering and sharing of essential information for effective health care” (CFPC, 2020).⁵¹ A common issue that may undermine effective communication and understanding are language barriers. Language barriers refer to a situation where there is a challenge due to different predominant languages used by the provider and patient.^{52,53} A number of studies have suggested that language barriers in the health care setting are damaging to the physician-patient relationship and to the patient’s health.^{34,37,40,52,53} Many problems can arise from language barriers, such as the conveying of critical health information, establishing a relationship that helps to maintain good health over the long term, patient-access to health services, patient safety, the efficiency and effectiveness of the healthcare system as well as patient empowerment towards their own health.⁴⁰

Quality in healthcare is of utmost importance for our healthcare system as it “contributes to patient safety, health outcomes and considers how well health care services are being provided to patients. (p.1)”⁵⁴ Studies on language barriers have found that the quality of care a patient is receiving can be affected when there is poor communication. This can include longer hospital stays,⁵⁵ increase in medical errors⁵⁶ and lower patient satisfaction.⁵⁷⁻⁶⁰ It has also been suggested that even with the use of an interpreter in a language-discordant medical encounter (i.e., when patient does not speak same language as physician), the care can be suboptimal.^{59,60} However, the vast majority of studies on language barriers that have been conducted are with Spanish-speaking

patients speaking to an English-speaking provider.⁵⁸⁻⁶⁰ A recent study found that Francophones in northern Ontario experience many emotions when visiting the FP's office, some of which are negative due to language discordance.⁶¹ The emotions included feeling discomfort, inaccessibility, insecurity and personal inabilities.⁶¹ The research showed that patients in linguistically discordant situations experienced negative emotions such as stress, worry, nervousness, feeling challenged, insecurity, inferiority, uncertainty and embarrassment, while persons in concordant situations expressed emotions tending towards a more favorable patient experience.⁶¹

2.4 NOSM's social accountability mandate

When NOSM was founded in 2003, they became the first medical school in North America to be hosted by two universities 1,000km apart (Laurentian University and Lakehead University). With both campuses being located in northern Ontario, NOSM is mandated to educate physicians as well as to contribute to care in the vast 800,000km² geographic regions of urban, rural and remote communities of northern Ontario.¹ Given issues related to shortages and geographic maldistributions of physicians, NOSM plays a key role in supplying the workforce for the north.^{16,62} The mission is: "The Northern Ontario School of Medicine (NOSM) is committed to the education of high quality physicians and health professionals, and to international recognition as a leader in distributed, learning-centered, community-engaged education and research." (Vision, Mission and Values, 2018).³ They aim to accomplish this by:

"Being socially accountable to the needs and the diversity of the populations of northern Ontario; actively involving Aboriginal, Francophone, remote, rural and underserved communities; leading and conducting research activities that positively impact the health of those living in northern communities, fostering a positive learning environment for learners, faculty, and staff; achieving an integrated, collaborative approach to education, learning, and programming; increasing the number of physicians and health professionals with the leadership, knowledge and skills to practice in northern Ontario." (Vision, Mission and Values, 2018)³

To reiterate, NOSM adheres to the World Health Organization's (WHO) Social Accountability mandate of Medical Schools, that states:

“The obligation to direct their education, research and service activities towards addressing the priority health concerns of the community, region and the nation that they have a mandate to serve. The priority health concerns are to be identified jointly by governments, health care organizations, health professionals and the public.” (p.888) ⁶³

In order to address the health care needs in northern Ontario, NOSM has followed this directive in developing and implementing their curriculum, research and community partnerships by actively involving Indigenous, Francophone, remote, rural and underserved communities.¹ To do so, in part, NOSM actively seeks applicants at entry who mirror the demographics of the north, including Francophones, from rural and northern Ontario.¹

At admission, NOSM requires applicants to meet a certain criteria in order to have the Francophone designation. The criteria, as stated on the NOSM website⁶⁴, are:

- A. *Speak French fluently*
- B. *Meet at least one (1) of the following criterion:*
 - i. *Have a Francophone parent **and** minimum of eight (8) years of French-language school attendance (French immersion is not applicable), or*
 - ii. *Graduated from a French-language high school (French immersion is not applicable), or*
 - iii. *Are able to demonstrate the use of French in daily activities and a connection to the Francophone community. Being able to speak French is not sufficient to fulfill this criterion.*

2.5 NOSM Curriculum

The NOSM curriculum incorporates a number of community and practical experiences into the undergraduate education program. The curriculum has structured clinical skills (SCS) and also sessions during the first and second year that focus on improving patient-doctor communication and examination skills. Small group sessions use simulated or standardized patients to practice their interviewing and examination skills under the guidance of a clinical preceptor. Community learning sessions (CLS) also occur during the first two years of medical education and are held

weekly.⁶⁵ A range of community-based clinical experiences and interprofessional learning are gained by participating in the CLS. Under the guidance of a preceptor, medical learners' interact with, or observe, patients in actual healthcare settings. For example, learners' have the opportunity to be in hospitals and other healthcare settings such as long-term care facilities and pharmacies.

There are 11 case-based modules (CBMs) that are held during the first two years of undergraduate medical education, each case covers a major body system.⁶⁵ The focus of the cases is used to prepare learners' for practicing in northern locations by providing northern and rural themes, such as Indigenous health and Francophone health. During all years of medical education five themes link teaching, learning and assessment into a single integrated curriculum. Each CBM's content is organized around these five themes: 1) northern and rural health, 2) personal and professional aspects of medicine practice, 3) social and population health, 4) foundations of medicine, and 5) clinical skills in health care.⁶⁵

Integrated community experience (ICE) modules are incorporated into the first and second year of the curriculum. The first-year module involves an Indigenous community placement lasting over 4-weeks. The placement helps the learner to familiarize themselves with Indigenous culture and practice patterns in remote communities. In second-year, there are two four-week placements in rural/remote placements. These placements are used to allow learners' to focus on practicing clinical skills and making diagnoses within rural contexts.⁶⁵

In third-year learners' are immersed into a comprehensive community clerkship (CCC) experience. This CCC involves learners' completing an eight-month placement in small urban or large rural northern Ontario communities. During the CCC, learners' are provided with opportunities to enhance their knowledge, acquire skills and develop positive attitudes toward eventual work in remote, rural and underserved communities in northern Ontario.⁶⁵

Fourth-year consists of six clinical block rotations, (surgery, internal medicine, children's health, emergency medicine, women's health, mental health) plus elective rotations of choice. This allows learners' to be integrated into different specialties and subspecialties, providing opportunity to hone in on career options.⁶⁵

Although NOSM's medical program is not delivered in French, there are numerous opportunities available to enhance the experience of French-speaking learners' including educational resources, self-directed study groups, interest groups, as well as elective opportunities. NOSM also provides the opportunity to complete clinical placements in Francophone communities with Francophone preceptors, thus providing opportunities for French-speaking learners' to learn and deliver care in French.

2.6 Description of tracking study

Since NOSM's inaugural year in 2005, there has been an ongoing study conducted by the Centre for Rural and Northern Health Research (CRaNHR) with the support of NOSM, to track all NOSM undergraduate and postgraduate medical learners' called the Centre for Rural and Northern Health Research (CRaNHR) Tracking Study of NOSM medical learners' and residents (TS). As NOSM learners', from both Laurentian and Lakehead campuses, progress through the stages of their medical education and into the medical workforce, they are given the opportunity to participate in the tracking study by completing a series of surveys. The purpose of the tracking study is to obtain information on the learners' basic demographics, details of the learners' educational experience at NOSM and selected information upon entry and exit to and from the NOSM undergraduate and postgraduate programs.⁶⁶ The TS allows researchers to track learners and assess NOSM's responsiveness to the needs and the diversity of the people in northern Ontario.

For the purpose of this major paper, I focused on the language competence components of the TS at entry and at exit of the undergraduate program.

2.7 CPSO Registry and Annual Membership Renewal Survey

The medical profession in Ontario is licensed and regulated by the authority of the CPSO. The CPSO issues certificates of registration to physicians allowing them to practice medicine in Ontario—all doctors are required to be members of the College in order to practice in Ontario.⁶⁷ The registry contains information on the physician's credentials, practice location, demographics and languages spoken.⁶⁸ In this study, a secondary data analysis was conducted using the publicly available physician search on the CPSO website. (<https://www.cpso.on.ca/Public-Information-Services/Find-a-Doctor>).

3.0 RATIONALE

NOSM's undergraduate admission committee encourages applications from learners' who reflect northern Ontario's population demographics; which includes Francophones. The eventual supply of French speaking physicians in the north is important, mainly for four reasons; 1) the importance of primary health care in attaining good health, 2) the health of Francophones, particularly in the north is poor, 3) there is an inequitable distribution of French speaking physicians in Ontario, with the north being particularly underserved, and 4) the influence of services in preferred languages having a positive impact. As such, assessing French language capacity among NOSM learners' from entry to NOSM through to practice will assess NOSM's impact on the French speaking physician workforce. Namely, how the school has an influence, if any, on training French speaking physicians and having them locate their practice where there is the greatest need for FLS. NOSM does not specifically educate their learners' in French but rather it seeks French speaking learners and provides them with opportunities to practice and learn in French settings.

4.0 RESEARCH QUESTIONS

4.1 Research Questions

- a) Are the responses regarding French language competency self-reported on the Centre for Rural and Northern Health Research Tracking Study of Northern Ontario School of Medicine learners' and residents (TS) at entry to NOSM undergraduate medical education different from that recorded in the College of Physician and Surgeons of Ontario (CPSO) website once they are in independent practice?

- b) Are the responses regarding French language competency self-reported on the TS upon graduation (exit) from NOSM undergraduate medical education different from that recorded on the CPSO website once they are in independent practice?

- c) Do French-competent NOSM medical graduates establish their practices in areas densely populated by Francophones in northern Ontario?

5.0 METHODS

5.1 Project Framework

This major paper was guided by the use of a variation of the “organizational effectiveness” conceptual framework to assess whether NOSM’s French-competent graduates are practicing in communities more densely populated by Francophones. Organizational effectiveness encapsulates the concept of how effective organizations are in achieving their goals.^{69,70} The variant of organizational effectiveness used in this project is called the Open-Systems Theory and was advanced by Katz and Kahn (1978).⁷¹ The theory was then further described and explained in a book review by Panchal (n.d).⁷²

The open-system approach simply refers to the concept of an organization being open to their environment, so that they are continually in a state of flux.^{71, 72} The theory begins with the concept of entropy, the assumption that without continued inputs any system will gradually decline into disorder.⁷¹ Therefore, organizations must rely on “inputs” from the environment to drive changes within the organization.^{71,72}

Authors of this theory suggest that a successful organization relies on interactions with its environment via inputs, throughputs and outputs to revitalize itself. Inputs refer to “the importing of resources and information from the external environment.” (p.23)⁷¹ Thus, they are the resources and information that the organization is taking from the current environment in order to formulate and implement change. The throughputs are “the processing of production inputs to yield some outcome that is then used by an outside group or system” (p.3).⁷¹ In other words, they are the activities within the organizational system that reorganizes the inputs in order to complete the work required. Lastly, the outputs are the outcomes and services created or delivered by the organization. Therefore, the outputs “export some product into the environment.” (p.24)⁷¹ The open systems

approach provides key information from the environment in order to inform internal processes, leading to change and eventually survival.

Appendix A provides an overview of the inputs, throughputs and outputs of the open-systems theory that will be used as the framework for this project. I will be using the open-system framework to examine the organizational effectiveness of NOSM in meeting its social accountability commitments with regard to the needs of Francophone northern communities, by educating physicians who are able to provide FLS. This major paper will incorporate the concepts identified in the framework by using NOSM's social accountability mandate to address the needs and diversity of the population it serves (environment) as the inputs. Specifically, the input of interest is NOSM's goal to address the needs of Francophones in northern Ontario by preferentially selecting learners' capable of speaking French in the admission process. The throughputs are the NOSM curriculum, and activities and experiences the school implements throughout the learners' undergraduate degree which in theory should promote the development of physicians who can practice in French in Francophone communities. While the throughputs are not directly studied in the current project, the throughput elements, such as what the school offers to the learners' throughout their undergraduate degree were briefly outlined in the literature review and will assist in interpreting some of the findings and lead to additional recommendations. Thus, by using this model it is implied that the school is promoting/supporting a desired outcome. The throughputs in NOSM's case is not to teach learners' French but to provide them opportunities to have confidence and the desire to practice in French in areas where French language services are needed. Lastly, the output is whether French physicians are practicing in French communities. This major paper will focus primarily on the output.

To do so, I will analyze whether or not French competent physicians practice in Francophone communities. To summarize, I am examining whether NOSM is being a socially accountable institution by meeting the needs of the Francophone population in northern Ontario. I am determining this by looking at whether the school's French-competent learners' eventually report competency to practice in French and later establish their practices in areas with higher proportions of Francophones in northern Ontario.

As a guide, the study design first identified the French-competent learners through the self-reported TS at entry and at graduation (exit) to NOSMs undergraduate medical program. The responses were then compared to the recorded language competency responses on the CPSO website once they were in independent practice. At this point, primary practice location was also recorded from the learners CPSO registry to establish where their practices were, in order to identify whether they were in areas densely populated by Francophones in northern Ontario. The statistics Canada Census profiles allowed me to calculate the degree of Francophonie of communities for each eligible responds primary practice location.

5.2 Data Source 1

TRACKING STUDY

5.2.1 TS Variables

Linguistic competence

Linguistic competence was determined by identifying TS respondents with the ability to either proficiently or competently speak in French. Only the cohorts up to 2011 are included in this study, as those are the NOSM graduates that would theoretically be in practice at the time of

this research. The language questions on the TS evolved over the course of the TS. The question initially asked the respondents in what languages they can speak and/or write proficiently with French, English or Other as options. The question later evolved into what languages they can speak and/or write competently: French, English or Other. The learners had the ability to mark both French and English. Learners' with any indication of the ability to *speak French* in either variation of the language question were considered "French-competent". The 2005-2007 cohorts had the 'proficiency' question at both entry and exit; the 2008-2010 cohorts had the 'proficiency' question at entry and the 'competency' question at exit; the 2011 cohort had the 'competency' question at both entry and exit. The term linguistic competence is used from this point forward to capture any indication of French speaking proficiency or competency based on response from the TS.

5.3 Data Source 2

5.3.1 CPSO Variables

CPSO language indicator

On the 2019 CPSO-AMRS physicians were asked to indicate the languages in which they felt competent enough to conduct their practice. The responses to this question are publicly available on the CPSO website. I searched for, and recorded, the practice language proficiency data from the CPSO website for all NOSM graduates who completed an undergraduate medical education degree between the 2005-2011 and who had also completed an entry or an exit TS survey.

Physicians who identified as French, French and English, or French and Other were identified as French-competent physicians. NOSM graduates who are not licensed for practice in Ontario, but may be licensed to practice in other jurisdictions, were excluded because the study focused on practice in Ontario. The names of NOSM learners were publicly available and were published

annually in major Canadian newspapers. This variable was then compared to that of the TS Entry and Exit survey responses in order to determine if self-reported language competence changed from entrance to UG education to independent practice and similarly from exit of UG education to independent practice.

Primary practice location

Primary practice location was used to identify the location of NOSM graduates in Ontario. The geographic location of the primary practice address was identified using the six-character postal code listed in their CPSO registry. The Forward Sortation Area (FSA) of the Canadian postal codes was used to define the north. With no distinct boundary separating northern and southern Ontario boundaries, the FSA's beginning with P was defined as northern and all other remaining postal FSAs (K, L, M or N) as southern Ontario. It should also be noted that this classification of north and south is not universal, but has been used in prior health research.^{4, 39} While the categorization is not exact, it closely reassembles the delineation that was used by the former LHINs to describe northern and southern.⁷³ This delineation has also been used by the Government of Ontario and is applied in the Rural and Northern Health Framework.⁷⁴ This analysis allowed me to classify the practice location of NOSM graduates practicing in Ontario.

French communities

The degree of Francophonie in Ontario CSDs were based on prior research conducted by Timony et al.³⁹ Using 527 communities in Ontario, Timony et al. identified strong French communities as having a Francophone population of $\geq 25\%$; moderate French communities with 10-24%; and

weak French communities with <10%. For this major paper, I interpreted French communities as any community falling within the moderate and strong categories. Further details are provided in the following section, Data Source 3.

5.4 Data Source 3

2016 Statistics Canada Census Profile

5.4.1 Description of Statistics Canada Census Profile

The third data source that was used in this study was Statistics Canada’s Census Profile. The census population program conducts a survey every five years in order to give a statistical portrait of the country. The census profile includes a variety of information on census subdivisions (municipalities) such as population numbers, age characteristics, marital status and languages spoken.⁷⁵ For the purposes of my major paper, the physicians’ primary practice addresses with postal codes were found on the CPSO website which were then used to find census subdivisions (CSD) in which they currently practice. Once the CSD profile had been found, “The first official language spoken” category in the census profile of each CSD was used to indicate the CSD’s degree of Francophonie as a percentage. The percentage is calculated by adding all individuals who spoke primarily French and those who were capable of speaking both English and French within that CSD and divided by the total population in the CSD. First official language spoken equation:

$$\frac{\text{CSD French population} + \text{CSD English and French speaking population}}{\text{Total population in CSD}}$$

5.5 Operational Definitions

NOSM UG learner

A learner having completed a 4-year undergraduate medical education at NOSM.

French-competent learner

A learner having completed the TS (Entry or Exit) and has reported competency (or proficiency) to speak in French. These learners' may have also reported being able to speak in French and English, or French and other. Not all French-competent learners' were considered Francophone by NOSM upon entry.

English speaking learner

A learner having completed the TS (Entry or Exit) and has reported no competency to (or proficiency) speak in French.

Northern Ontario

All primary practice postal codes beginning with P were defined as northern Ontario. All other postal codes (K, L, M or N) were defined as southern Ontario.

Family Physician

Physician who currently holds a certificate from the College of Family Physicians of Canada (CFPC) and has completed a two-year residency training program in family medicine.

Specialists

Physician who currently holds a Certificate in the Royal College of Physicians and Surgeons of Canada (RCSPC). Therefore, has completed a residency training program in a specialty program.

Undergraduate studies

Only undergraduate learners' who attended the NOSM between 2005-2011 were located in order to link undergraduate studies at NOSM to independent practice locations.

Learners' who did not complete a survey were excluded.

5.6 Ethical approval, confidentiality and security

The study has been reviewed and approved by the Laurentian University Research Ethics Board (Romeo File No. 6017192). The author was granted access to a specific sub-set of data from the TS, which is stored on the CRaNHR secure server. At no point was the author given permission to download or otherwise remove the data files from the server. In order to ensure confidentiality and prevent possible residual disclosure, aggregate data was presented in large cell sizes, such as Northern Ontario and Southern Ontario. (REB Certificate is shown in Appendix B)

5.7 Data analyses

Response rates for the TS were evaluated and basic descriptive statistics were used to determine if NOSM learners' who reported having French as a language of competence in the entry survey also had CPSO French status. Similarly, those who reported having French as a language of competence in the exit survey and had CPSO French status were evaluated. Referring to these two groups of graduates, the data was used to determine whether they located their practices in areas densely populated by Francophones in northern Ontario. Chi-square analyses were conducted to determine whether demographic variables were associated. (i.e. Language spoken in practice vs. community categorization, practice location vs. community categorization)

A value of $p < 0.05$ was considered a statistically significant result for all tests. The software program that was used to conduct all tests was SPSS (Version 19.0.0).

6.0 RESULTS

6.1 TS Descriptive Statistics

6.1.1 *TS respondent and demographic data at entry*

The average response rate for the TS for the 2005/06 to 2011/12 cohorts at entry was 91% (n=372) compared to 84.3% (n= 337) at exit (Table 1). The 2011/12 cohort achieved the highest response rate with 100% at entry and 87.3% at exit. A total of 289 respondents, representing 72.2% of all NOSM UG medical learners' from the 2005 to 2011 cohorts, had completed both entry and exit TS surveys. Some respondents did not complete their UG medical education at NOSM and were removed from the study. Thus, of all NOSM UG medical learners' from the 2005-2011 cohorts, 88.9% (n=364) and 77.5% (n=310) were identified as eligible to participate in the study having completed a survey at entry or exit, respectively (Table 2). For the purpose of this study, that number later changed to 84.4% (n=346) and 75.5% (n=302) because of missing information in the language section of the TS survey.

At entry, a total of 70% identified as female, while the remaining 30% identified as male respondents. Similarly, at exit a total of 69.0% were female. The age of respondents ranged from 21 to 52 years old at entry and 21 to 48 at exit (Table 3).

6.1.2 *TS entry and exit survey responses*

The distribution of language competence responses of the 2005-2011 cohorts at entry and exit are presented in Table 4. This table also outlines the years the TS evolved from asking proficiency to competency in both entry and exit.

6.1.3 TS Language competence responses at Entry

Of the 364 respondents to the entry survey, 95% (n=346) had responded to the language component of the survey. Of the 346 respondents, 39% (n=135) identified being able to proficiently/competently speak in French.

6.1.4 TS Language competence survey responses at Exit

Of the 310 respondents to the exit survey, 97.4% (n=302) had a response to the language component of the survey. Of the 302 respondents, 38% (n=115) identified being able to proficiently/competently speak in French.

6.1.5 CPSO Languages Spoken

Of the 346 eligible respondents from the entry survey, 305 were identified on the CPSO website (Table 5). At exit, of the 302 eligible respondents, 261 were identified in the CPSO website. Reasons for not being found on the CPSO website may include the NOSM graduate was not practicing in Ontario, they were still in post-graduate training, they have changed their name etc. Referring to the two groups of NOSM graduates (entry and exit), NOSM graduates indicating French proficiency on the CPSO website varied between 20% (n=61) from the TS at entry and 21% (n=56) at exit. As such, 80% (n=244) of entry respondents and 79% (n=205) of exit respondents identified English or English and another language as their languages spoken in the CPSO registry.

There were 135 graduates who self-reported French language ability in the entry survey. Of these, 103 had records in the CPSO database, with 54 of the 103 indicating that they were

competent to practice in French. This meant that 48% of French-competent learners' changed their mind once in practice. Seven graduates who had not reported French language ability in the entry survey indicated to the CPSO that they were competent to practice in French. (Table 6)

Of those who self-reported French language ability in the exit survey, there was 115 graduates. Of these, 89 had records in the CPSO database, with 54 of the 89 indicating that they were competent to practice in French. This meant that 39% of French-competent learners' changed their mind once in practice. Two graduates who had not reported French language ability in the exit survey indicated to the CPSO that they were competent to practice in French. (Table 6)

6.1.6 CPSO Primary Practice Location

Of the 305 respondents from the entry survey who are found on the CPSO, 58% (n=177) have a primary practice in a northern region of Ontario while 42% (n=128) are in southern Ontario (Table 7). Of the 261 respondents registered in the CPSO from the exit survey, 59% (n=154) have a primary practice in northern Ontario while 41% (n=107) are in southern Ontario.

6.1.7 French Community Categorization

6.1.7.1 Entry TS

Of the 305 eligible respondents from the entry survey, 62% (n=189) were located in communities having a Francophone population of <10% (weak) of its total population, while 38% (n=116) were located in communities having a Francophone population of $\geq 10\%$

(moderate-strong) of its total population (Table 8). Of all NOSM respondents of the entry survey in the CPSO registry, 20% (n=61) identify French as a language spoken in practice.

Alternatively, the TS survey responses at entry identified 39% (n=135) of respondents capable of speaking French. Specifically, when following those 135 French-competent respondents into practice, 103 are registered with the CPSO. Of the 103 respondents who identified speaking French in the TS at entry, 52% (n=54) identify French as a language spoken in practice. As a result, 70% (n=38) of NOSM French-competent respondents currently practicing in Ontario, are located in a community where its total population has a Francophone population $\geq 10\%$ (moderate-strong). More specifically, 59% (n=32) French-competent respondents are currently practicing in French northern Ontario communities. When solely examining the French respondents in the north, it was found that 91.4%, were in a French community.

Once again, it should be noted that these numbers are strictly looking at those who were identified as being able to proficiently/competently speak French in the entry survey. So when we looked at all learners' who completed the TS at entry, 61 were identified as being able to speak French in practice. With the increase of 7 learners' who did not identify as being able to speak French in the entry survey but felt competent in practice, the interpretation did not change- There were still 70% (n=39) of 61 French-competent learners' who located their practice in French communities, while 59% (n=36) of the 61 were in French northern communities. Furthermore, 92.3% of these French respondents in the north are in a French community. Other than a slight increase in French respondents in French northern communities, the interpretation remained the same.

6.1.7.2 Exit TS

The distribution of French communities identified among the respondents identified in the CPSO registry are also presented in Table 8. Of the 261 eligible respondents from the exit survey, 61% (n=160) were located in communities having a Francophone population of <10% (weak) of its total population, while 39% (n=101) were located in communities having a Francophone population of $\geq 10\%$ (moderate-strong) of its total population. Of all NOSM respondents of the entry survey in the CPSO registry, 21% (n=56) identify French as a language spoken in practice.

Alternatively, the TS survey responses at exit identified 38% (n=115) of respondents capable of speaking French. Specifically, when following those 115 French-competent respondents into practice, 89 are registered with the CPSO. Of the 89 respondents who identified speaking French in the TS at exit, 61% (n=54) identify French as a language spoken in practice. As a result, 70% (n=38) of NOSM French-competent respondents currently practicing in Ontario, are located in a community where its total population has a Francophone population $\geq 10\%$ (moderate-strong). More specifically, 63% (n=34) of the French-competent respondents are located in French northern communities. Additionally, when solely examining the French respondents in the north, 92% are in a French community.

As a breakdown, when looking at all TS exit survey respondents in the CPSO, 56 identified being able to speak French in practice. With the increase of two French competent/proficient respondents in practice, the interpretation did not change. That is, 70% (n=39) of 56 French competent/proficient learners' located their practice in French communities, while 63% (n=35) of the 56 were in French northern communities. To further this point, 92.1% of these French competent/proficient learners' in the north are in a French community.

6.2.0 Analysis of practice location and French language ability

6.2.1 Entry

A greater percentage of NOSM graduates located their practice within non-French communities of southern Ontario than in French communities of southern Ontario (81.3% vs. 18.7%); while the practice location within northern Ontario was more evenly distributed (52% within a French Community vs. 48% with a non-French community) ($\chi^2=33.403$, $df=1$, $p<0.001$, $n=305$) (Table 9). A greater percentage of English speaking NOSM graduates locate their practice within weak French communities when compared to strong French communities of (70.1% vs. 29.9%); while the French-competent NOSM graduates locate their practice within strong French communities when compared to weak French communities (70.5% vs. 29.5%) ($\chi^2=32.387$, $df=1$, $p= <0.001$, $n=305$) (Table 10).

A significant association was shown between the categorization of the community and the primary practice location, for French-competent respondents only ($\chi^2=21.920$, $df=1$, $p< 0.000$, $n=61$). A greater percentage of French-competent NOSM graduates locate their practice within strong French communities of northern Ontario compared to weak French communities of northern Ontario (92.3% vs. 7.7%); while French-competent NOSM graduates within southern Ontario locate their practice primarily in weak French communities compared to strong French communities (68.2% vs. 31.8%) (Table 11).

6.2.2 Exit

A greater percentage of NOSM graduates locate their practice within non-French communities of southern Ontario when compared to French communities of southern Ontario (81.3% vs. 18.7%); while the practice location within northern Ontario is more evenly distributed (52.6% within a French Community vs. 47.4% with a non-French community) ($\chi^2=29.183$, $df=1$, $p<0.001$, $n=261$), (Table 12). A greater percentage of English speaking NOSM graduates locate their practice within weak French communities when compared to strong French communities of (69.8% vs. 30.2%); while the French-competent NOSM graduates locate their practice within strong French communities when compared to weak French communities (69.6% vs. 30.4%) ($\chi^2=27.144$, $df=1$, $p<0.001$, $n=261$), (Table 13).

A significant association was shown between the categorization of the community and the primary practice location, for French-competent respondents only ($\chi^2=25.006$, $df=1$, $p<0.001$, $n=56$). A greater percentage of French NOSM graduates locate their practice within strong French communities of northern Ontario when compared to weak French communities of northern Ontario (92.1% vs. 7.9%); while French-competent NOSM graduates within southern Ontario locate their practice primarily in weak French communities compared to strong French communities (77.8% vs. 22.2%)(Table 14).

7.0 DISCUSSION

In this major paper, I examined NOSM's progress on its social accountability mandate toward Francophones in northern Ontario by evaluating the TS questionnaire responses regarding linguistic competence that are administered upon entry and exit of undergraduate medical education. Specifically, the objective of this major paper was to provide preliminary evidence of NOSM's graduates who report French language ability at entry and exit from their undergraduate medical education program and subsequently whether they are registering with the CPSO that they are capable to offer FLS to their patients and whether these physicians are locating their practices in areas of greatest need for such services. The Open Systems Theory advanced by Katz and Kahn (1978)⁷¹ was chosen as the conceptual framework as it highlights specific factors that may contribute to organizational effectiveness. In the context of the Open Systems Theory, the first concept (inputs) was NOSM's social accountability mandate to address the needs and diversity of the population it serves (environment), more specifically, NOSM's goal to address the needs of Francophones in northern Ontario by having admitted Francophone/French-competent learners' to its undergraduate program. The second concept of the theory (throughputs), although it was not directly studied in this paper, implied that the education, activities and experiences the school implemented throughout the learners' undergraduate degree at NOSM promoted the development of physicians who can practice in French within Francophone communities. The theory then includes the outputs; such as the services that NOSM created or delivered (outputs). The 'inputs' and 'outputs' were the main foci of this paper.

Applying the Open-Systems Theory, there were three main findings: 1) NOSM has a high proportion of French-competent learners' at entry; 2) NOSM graduates a considerable number of physicians who identify French as a language of competence in practice, however a substantive

percentage of NOSM graduates did move from French-competent during their undergraduate studies, to not identifying French as a language of competence in the CPSO; and 3) NOSM does indeed graduate physicians who speak French and who locate their practices in French communities, and particularly in French communities of northern Ontario. Together, these findings suggest that NOSM may be contributing to improving the health of Francophones in northern Ontario by graduating French physicians who eventually practice in French communities in the north.

7.1 NOSM accepts a high percentage of French-competent learners' at entry

The first main finding of this study demonstrated that a high percentage of respondents at entry (39%) and exit (38%) were French-competent. While NOSM does not specifically reserve spots for medical learners' capable of speaking French, the organization's goal is to have class profiles which reflect the demographics of northern Ontario. As such, NOSM actively seeks applicants who are from northern Ontario and are Francophone, thus mirroring the demographics of the north.^{1,3,62} Knowing that nearly 5% (n=611 500) of Ontario's total population is considered Francophone (largest outside of Quebec)¹³ and that northern Ontario's 23% represents a substantially greater proportion of Francophone residents compared to the province as a whole¹², NOSM's high percentage of graduates proficient in French in the entry survey (39%) and exit TS surveys (38%) suggest that the school is "mirroring", if not surpassing, the demographics of Francophones in northern Ontario.

NOSM's application process requires applicants to meet a certain criterion in order to have the Francophone designation.⁶⁵ This designation allows learners' to be identified as a

Francophone learner throughout their undergraduate medical education at NOSM. This is important, as it helps to understand a portion of the French learners' admitted to NOSM. Although the language used for communication, instruction and assessment at the school is English, there are numerous opportunities provided to Francophone learners' to enhance their experience and enrich their educational resources to hopefully one day deliver care in French. As such, the only requirement is that Francophone learners' include Francophone communities in their ranking of the Comprehensive Community Clerkship (CCC) site selection process in their 3rd year of medical school.⁶⁵

Overall, this first main finding supports that NOSM is making efforts to be socially accountable to the needs and diversity of northern Ontario via admitting a large portion of proficient French-competent learners' (Inputs) and graduation of French-competent learners' (Outputs). Therefore, NOSM's mission of increasing the number of French physicians in rural and northern Ontario by graduating French learners' from, and training them in, rural and northern regions is supported by the preliminary results of this major paper. Thus, NOSM is showing signs of addressing the worldwide challenge of recruitment and retention of physicians to rural and remote communities⁷⁶ by reflecting the population distribution of northern Ontario in their class profiles⁷⁷, specifically for Francophones. This finding further aligns with existing literature suggesting that medical graduates who mirror the demographics of the region were more likely to practice in the rural settings.⁷⁷⁻⁷⁹ Therefore, by recruiting learners' who reflect the demographics of northern Ontario and who are educated in its context, there is an increased likelihood that learners choose to work in those settings after graduation.⁸⁰ French-competent learners' from the undergraduate medical program at NOSM were more likely to practice in French communities. This higher likelihood of French-competent learners' practicing in French

communities in Ontario, could potentially be attributed to NOSM's undergraduate admission criterion that preferentially selects medical learners' with a Francophone background.

Subsequently, with a high percentage of French-competent learners' at entry, NOSM is aligned with existing literature on the benefits of mirroring the demographics of the region it serves,⁷⁷⁻⁸⁰ in order to address the challenges of maldistributions and shortages of French-competent physicians in rural communities, particularly in northern Ontario⁴.

7.2 NOSM produces French-competent physicians who identify French in practice

The second main finding of this study was that NOSM is graduating French-physicians who identify being able to speak French in practice. The TS revealed that 39% and 38% of learners at entry and exit self-reported as French-competent. Once in practice, when following the respondents, that percentage drops to 20% and 21%. Knowing that communication is a fundamental aspect in a health care setting and that nearly 5% of the total population of Ontario is considered Francophone,^{12, 49} the fact that 1 in 5 NOSM graduates identify being able to practice in French may be considered a success. Furthermore, existing literature by Gauthier et al. (2012) and Timony et al. (2013) identified that approximately 15% of all Ontario-based physicians identified being able to provide services in French^{16, 39} Thus, the preliminary results suggest that NOSM graduates are in fact contributing to an increased supply of French-competent physicians. These preliminary results also imply that NOSM is remaining socially accountable to the region it serves by increasing the potential for French services to be delivered in Ontario and perhaps increasing the odds of addressing the challenges of language barriers in the healthcare setting.^{34,37,39,52,53}

It is also important to note that within this study we found that although NOSM has a high percentage of French-competent learners at entry and exit, that number diminishes considerably once in practice. When analyzing the entry results, it was shown that 48% of the French-competent learners' changed their mind once in practice and no longer identified the capability to offer services in French. Similarly, the exit results showed that 38% changed their mind once in practice. Specifically, of all TS French-competent learners' that were found in the CPSO, 48% and 38% did not self-report their ability to provide French language services in practice. This is important to note because it shows that following graduation from NOSM UG there is a drop in respondents identifying as French-competent once in practice. As mentioned, at entry 39% (135/346) and exit 38% (115/302) identified French as a language of competence, once in practice that number drops to 20% (61/305) and 21% (56/261).

There are number of potential reasons why this might be happening; I postulate that it may be possible that: 1) after UG education some graduates are not as confident in their abilities as they initially thought, 2) some NOSM graduates are competent in French but do not want to divulge that they speak French once in practice, and/or 3) some NOSM graduates may feel an increased obligation or pressure to adhere to NOSM's mandate during their studies, however, once in practice they no longer feel obligated to identify as French-competent.

It is possible that once some NOSM graduates are in practice they do not feel as confident in their French-competent abilities as they initially thought. Therefore, the numbers during UG could be overestimated by an over confidence when in school as they are educated in English and are not speaking French in school. Learners may not recognize (over confidence) during their UG with respect to the demands of providing FLS or building competence, but as they gain experience and knowledge in the field they may find themselves overwhelmed with the

realities of providing coordinated care, specifically in French. A study by Oriol et. al (2004) described a psychological uncertainty known as the “imposter phenomenon” in the context of medical residents.⁸¹ The phenomenon was described as family medicine residents often doubting their ability to become competent family physicians and who believe themselves to be less intelligent and less competent than others perceive them to be. Consequently, it is possible that French-competent learners develop a doubt in their ability to be competent French-competent physicians leading into practice, since they were educated in English. Furthermore, with the prevalence of physician burnout rates being very high,⁸² it is also fair to assume that new physicians may fear being overwhelmed once in practice. Specifically, physician burnout is characterized as emotional exhaustion, depersonalization, and a feeling of low personal accomplishment.⁸³ For instance, Rotenstein et al. (2018) conducted a systematic review of 182 studies involving 109 628 individuals in 45 countries. The study characterized the methods used to assess burnout and provided an estimate of the prevalence of physician burnout.⁸³ Although the study was challenged by a large variability in the rates of burnout and a lack of agreed upon terminology with over 142 unique definitions, most authors in the literature of physician burnout suggest that the prevalence rate was near 50% of all physicians.^{84 - 86} With work overload being a key driving force behind physician burnout,⁸⁷ the large need for French-competent physicians in northern Ontario may cause learners to fear identifying French as a service provided in their practice because of the high demand and high prevalence rates of physician burnout.^{16, 40, 82- 87}

Another possibility for NOSM learners’ feeling an obligation to adhere to NOSM’s mandate during their studies but changing their mind in practice, may be explained by learners recognizing that the school actively seeks Francophone applicants for admission, and if they were admitted as a Francophone they may feel an obligation toward the school to respond in this

manner on the TS.^{1,3,64} To further this point, the social accountability mandate of NOSM clearly outlines the school's desire to address the needs of the Francophone population, this coupled with the school's French curriculum activities⁶⁵ or Francophone health modules, may lead learners' to feel obligated to divulge that they speak French during UG. On the contrary, once the learners are in practice it is possible that they may no longer feel the perceived obligation to self-report their ability and willingness to provide FLS in practice.

On the other hand, there was a small percentage of learners' who did not report any French language ability while at NOSM, but later identified the ability to provide French-language services. Seven NOSM learners' who completed the Entry survey and two learners' who completed the Exit survey did not identify the ability to speak French during their UG studies, but later identified being capable of providing French language services. This increase could be due to the differences between earlier and later cohorts, as TS language question evolved from asking proficiency to competency. Another explanation could be due to NOSMs detailed Francophone criteria when applying to the school, thus learners' may feel as though they do not meet NOSMs criteria to divulge that they speak French.⁶⁵ Moreover, it could also be that learners build competence speaking French during their UG studies.

In this major paper, I found that NOSM, even though a percentage of learners' no longer indicate that they can practice in French, are still graduating a good percentage of physicians who can provide FLS. As such this may be considered one of NOSM's successes, as it shows the school is addressing the lack of access to FLS available by Francophones, which may play a role in the poorer health outcomes of this population, particularly in northern Ontario.^{18, 34, 37, 38}

7.3 French-competent NOSM Graduates locate their practice in French Communities

In this study I also found that French-competent NOSM graduates established their practices in areas densely populated by Francophones in Ontario. As the results showed, 70% of NOSM French-competent TS respondents currently practicing in Ontario were located in a community where its total population had a moderate-strong Francophone population. Of the TS respondents who had indicated that they were French-competent during their UG degree at NOSM and reported their willingness to provide medical services in French in practice, over 60% are practicing in French communities of northern Ontario. When solely examining the French respondents in the north that indicated French competency in practice, 92% are in a French community. This suggest that NOSM is graduating French-competent physicians who are eventually locating their practice in areas densely populated by Francophones, especially in northern Ontario. These findings further suggest that NOSM physicians are locating their practices in areas of greatest need, which aligns with the social accountability mandate to provide French services in French communities of northern Ontario.^{1, 3, 16, 61, 62} Thus, a high proportion of physicians who indicated a willingness to provide French language services are practicing in French communities.

By using primary practice location to identify where NOSM graduates are currently practicing in Ontario and language competency from their CPSO registry to identify what languages they offer in practice as indicators of NOSMs output, and as suggested by the project framework, one can speculate that the results generated are in fact compatible with the existing literature on NOSM responding to the needs of the Francophone communities in northern Ontario.^{16, 61, 62} The results are compatible with the existing literature as they show that NOSM is addressing

the maldistribution of French-competent physicians in Ontario and are graduating physicians capable of offering FLS. As shown, the majority (70%) of French-competent graduates are practicing in French communities (Francophone population $\geq 10\%$) and $\sim 92\%$ of French respondents in the north are in a French community. Thus, the results suggest that by NOSM providing physicians capable of offering French-language primary health care services, they are addressing the needs of northern Ontario's vulnerable Francophone population.^{16, 34, 38}

7.4 Limitations

The limitations of this study include a non-respondent bias, social acceptability bias (inclination towards French responses), unknown variability within the NOSM curriculum experiences and differences among cohorts in the phrasing of language questions in the tracking study and CPSO questions.

7.4.1 Non-respondent bias

The TS is a voluntary study conducted by the Centre for Rural and Northern Health Research (CRaNHR) with the support of NOSM. Furthermore, participants could skip questions or withdraw from the study. However, response rates for the 2005/06 to 2011- /12 cohorts were very high ranging from 84.4% (n=346/372) at entry to 75.5% (n= 302/337) at exit, and this somewhat mitigates non-response bias. Nevertheless, The potential demographic and questionnaire response differences that may exist between the respondent and non-respondent groups are unknown.

7.4.2 Social acceptability bias- Inclination towards French Responses

The Northern Ontario School of Medicine outlines a social accountability mandate that involves improving the health of the people and communities of northern Ontario. A method of fulfilling this mandate for Francophone communities includes increasing the number of medical learners upon entry who possess the competency to speak in French, in hopes that after graduation they will practice in northern Francophone communities. As a result, it is possible that learners' who are admitted to the undergraduate NOSM program as Francophones or French speaking learners' may be more inclined to conduct their practices in French, ultimately scoring more French responses on the TS. To further clarify, many applicants or respondents recognize that NOSM attempts to recruit learners' who are Francophone. For this reason, these learners' may feel compelled to select French competency responses in the TS, therefore inadvertently creating a bias in the results.

7.4.3 Unknown French exposures during NOSM experience

NOSM's learner experiences during their undergraduate medical degree can vary dramatically. Based on the curriculum, the learners' experiences and interactions can vary based on the multitude of placements available. For example, in first year the learners are placed in an Indigenous Community, in second year in rural/remote communities and third year in small urban or rural northern Ontario communities. This variability can dramatically change experiences and interactions based on a number of factors such as where the community is located, the size of it and the types of patient encounters they were exposed too. Granted, the core NOSM curriculum remains consistent throughout their 4-year degree. Therefore, the variability is in the unique interactions and experiences learners' may have encountered during

these placements (ICE, CCC). Consequently, this can impact the learners' experience. However, the analyses of this study did not account for where learners' had conducted their placements, thus the influence of these experiences on where learners' may eventually practice is unknown. Subsequently, future studies involving the TS and CPSO registry should assess the impact learner placements may have on NOSMs desired outcome of improving the health of northern Francophone communities.

7.4.4 Differences in question phrasing

As mentioned earlier, linguistic competence was determined by identifying TS respondents with the ability to either proficiently or competently speak in French. The language questions evolved over the course of the TS from asking what languages the learners' can proficiently speak and/or write in to later asking what languages the learners' feel competent speaking and/or writing in. This difference in phrasing of the language questions among TS cohorts can present itself as a limitation as learners' may have interpreted the question differently, thus potentially changing their response. Another limitation could be the difference in phrasing between the TS question during the learners' UG and the CPSO's question on languages spoken in on the now practicing physicians' registry.

7.5 Implications and recommendations for NOSM

The goal of this study was to determine whether NOSM is meeting its social accountability commitments with regard to the needs of Francophone communities in northern Ontario. Having used the open-systems theory by Katz and Kahn (1978), one can speculate that a large portion of the school's French-competent learners' eventually report competency to practice in French and later establish their practices in areas with higher proportion of

Francophones in northern Ontario. The results of this study have suggested that the relationship between NOSM and eventual outcome of their French-competent learners' practice location could potentially be used to facilitate the realization of NOSM's social accountability mandate. The learner selection process used by NOSM admitted a high proportion of learners' who felt competent to identify French as a language spoken, even though there is a decrease of French-competent graduates who report capability in the CPSO once in practice. Further, a large percentage of French-competent NOSM graduates who identify capability to speak French in the CPSO, do end up practicing in French northern communities. Recommendations that can be applied to undergraduate French competent NOSM medical learners include additional experiences to ensure learner confidence and competency in practice, increasing interaction with French faculty, preceptors, staff, healthcare providers and/or Francophone interprofessional teams. To further address the physician needs of northern Ontario communities, NOSM may also consider admitting a higher proportion of French competent learners. Nevertheless, according to the results reported in this paper, NOSM is currently showing signs of meeting its social accountability commitments toward northern Ontario's Francophone communities.

7.5.1 Recommendations for future research

This study was limited to looking at whether the school's French-competent learners' eventually report competency to practice in French as well as whether they later established their practices in areas with higher proportions of Francophones in northern Ontario. While this is an indicator of whether or not NOSM is achieving its mandate, further in depth studies should be done to examine relationships between French-competent learners and their experiences and interactions during their undergraduate degree that may change their confidence, competence and

desire to practice in French in a French northern community. As mentioned in the theoretical framework, the throughput elements, such as what the school offers to the learners' throughout their UG degree could be further studied in depth to see where confidence and desire to practice in French in areas where French language services are needed could be improved. Future research should also examine location factors, work factors, external influences as well as demographic factors that influence interest in providing French services. This would undoubtedly provide valuable insight pertaining to language competency and practice location of NOSM graduates. Lastly, a mixed method approach incorporating qualitative interviews of practicing NOSM physicians and TS questionnaire data would also allow for a more in-depth interpretation, therefore yielding even more valuable insight that could be used in NOSMs recruitment and retention process in French northern communities. For example, specifically asking those that were French-competent as UG learners why they do not indicate they will offer FLS or finding out to what degree they actually do or do not offer FLS in practice.

8.0 CONCLUSION

The TS and CPSO registry facilitated the monitoring of NOSM French-competent learners' in this study and provided valuable information pertaining to language competency and practice location. In this major paper, I established that a good percentage of NOSM learners' speak French at entry and at exit of their undergraduate medical education. However, among these French-competent NOSM learners', a significant percentage do not report a willingness to provide French language services once in practice. Even with the decrease in the total numbers of proficient French-competent learners', once in practice there was still a good percentage of proficient French NOSM graduates who identified being able to speak French in practice, as shown on their CPSO registry. Additionally, the majority of proficient French-competent learners' identified in the TS, later practice in French communities, especially in French communities of northern Ontario. Overall, the findings from this study confirmed that NOSM is fulfilling its objective of being socially accountable to northern Ontario Francophone communities. To further assess NOSM's commitment to northern Ontario Francophone communities, information should continue to be gathered to track NOSM learners' beyond their undergraduate degree.

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10.0 TABLES

Table 1. Annual Tracking Study response rates (2005-2011)

Cohort	U.G Entry Response Rate	U.G Exit Response Rate	Completed Both
2005	50/56 (89.3%)	38/55 or (69.1%)	31
2006	46/55(83.6%)	43/52 or (82.7%)	36
2007	53/57 or (93.0%)	53/59 or (89.8%)	42
2008	46/58 or (79.3%)	45/54 or (83.3%)	36
2009	51/56 or (91.1%)	47/56 or (83.9%)	41
2010	62/64 or (96.9%)	56/61 or (91.8%)	50
2011	64/64 or (100%)	55/63 or (87.3%)	53
Total	372/410 or 91.0%	337/400 or 84.3%	289/400 or 72.2%

Table 2. Tracking Study completion rates for all eligible respondents

NOSM Learners' having completed an Entry, Exit or both surveys						
Cohorts	Entry (n)	Entry Percent (%)	Exit (n)	Percent (%)	Completed Both (n)	Percent (%)
2005	50/56	(89.3)	33/55	(60.0)	31/56	(55.0)
2006	45/55	(81.8)	42/52	(80.8)	36/55	(65.0)
2007	52/57	(91.2)	45/59	(76.3)	42/57	(75.0)
2008	45/58	(77.6)	42/54	(77.8)	36/58	(62.0)
2009	50/56	(92.9)	44/56	(78.6)	41/56	(75.0)
2010	58/64	(90.6)	52/61	(85.2)	50/64	(78.0)
2011	64/64	(100.0)	52/63	(82.5)	53/64	(83.0)
Total	364/410	88.9	310/400	77.5	289/400	72.2

Table 3. Age (years) distribution of Tracking Study respondents

	Entry (n=346)	Exit (n=302)
Mean	26	26
Median	24	24
Mode	22	22
Standard Deviation	5	5
Minimum	21	21
Maximum	52	48
Missing Survey Response	2	1

Table 4. Tracking Study-French Ability Question Results

All Cohorts				
French Language Proficiency-Speak	Entry (Proficiency, 2005-2010; Competency, 2011)		Exit (Proficiency, 2005-2007; Competency 2008-2011)	
	N	Percent (%)	N	Percent (%)
No	211	61.0	187	62.0
Yes	135	39.0	115	38.0
Total	346	100.0	302	100.0

n = number of respondents

Table 5. All Cohorts Analysis of Language Competence on College of Physicians and Surgeons of Ontario (CPSO)

ALL NOSM Graduates between 2005-2011 in the CPSO Registry				
Practice Language competence	Entry		Exit	
	N	Percent (%)	N	Percent (%)
English	244	80.0	205	79.0
French and English	61	20.0	56	21.0
Total	305	100.0	261	100.0

n = number of respondents

Table 6. All Cohorts Analysis of Language Competence from UG to practice.

French NOSM learners' graduates between 2005-2011		
Language Competence	Entry Survey	Exit Survey
	N	N
French Language Proficiency Tracking Study	135	115
Registered in CPSO	103	89
French Practice Language competence (in CPSO)	54	54
New French NOSM learners' who indicate competence in practice	7	2

n = number of respondents

Table 7. College of Physicians and Surgeons of Ontario (CPSO) Primary Practice Location

ALL NOSM Graduates between 2005-2011 in the CPSO Registry				
Practice Location	Entry		Exit	
	N	Percent (%)	N	Percent (%)
Northern Ontario	177	58.0	154	59.0
Southern Ontario	128	42.0	107	41.0
Total	305	100.0	261	100.0

n = number of respondents

Table 8. French Community Categorization

ALL NOSM Graduates between 2005-2011 in the CPSO Registry				
Level of Francophonie of Primary Practice Locations	Entry		Exit	
	n	Percent (%)	N	Percent (%)
Total population having \geq 10% of Francophones	116	38.0	101	39.0
Total population having < 10% of Francophones	189	62.0	160	61.0
Total	305	100.0	261	100.0

n = number of respondents

Table 9. Community Categorization vs. Primary Practice Location (n=305) from entry survey.

ENTRY	Primary Practice Location			
Community Categorization		Southern Ontario	Northern Ontario	Total
	Within French Community	18.7% (24)	52.0% (92)	38.0% (116)
	Within Non-French Community	81.3% (104)	48.0% (85)	62.0% (189)
	Total	100.0% (128)	100.0% (177)	100.0% (305)

$\chi^2=33.403$, $df=1$, $p<0.001$, $n=305$

Table 10. Community Categorization vs. Language Competence in Practice (n=305) from entry survey.

ENTRY	Language Spoken in Practice			
Community Categorization		English	French	Total
	Within FC	29.9% (73)	70.5% (43)	38.0% (116)
	Within NFC	70.1% (171)	29.5% (18)	62.0% (189)
	Total	100.0% (244)	100.0% (61)	100.0% (305)

$\chi^2=32.387$, $df=1$, $p= <0.001$, $n=305$

Table 11. Community Categorization vs. CPSO Region (French Respondents) (n=61) from entry survey.

ENTRY	Primary Practice Location			
Community Categorization		Southern Ontario	Northern Ontario	Total
	Within FC	31.8% (7)	92.3% (36)	70.5% (43)
	Within NFC	68.2% (15)	7.7% (3)	29.5% (18)
	Total	100.0% (22)	100.0% (39)	100.0% (61)

$\chi^2=21.920$, $df=1$, $p< 0.000$, $n=61$

Table 12. Community Categorization vs. Primary Practice Location (n=261) from exit survey.

EXIT	Primary Practice Location			
Community Categorization		Southern Ontario	Northern Ontario	Total
	Within FC	18.7% (20)	52.6% (81)	38.7% (101)
	Within NFC	81.3% (87)	47.4% (73)	61.3% (160)
	Total	100.0% (107)	100.0% (154)	100.0% (261)

$\chi^2=29.183$, $df=1$, $p<0.001$, $n=261$

Table 13. Community Categorization vs. Language Competence in Practice (n=261) from exit survey.

EXIT	Practice Language Competence			
Community Categorization		English	French	Total
	Within FC	30.2% (62)	69.6% (39)	38.7% (101)
	Within NFC	69.8% (143)	30.4% (17)	61.3% (160)
	Total	100.0% (205)	100.0% (56)	100.0% (261)

$\chi^2=27.144$, $df=1$, $p<0.001$, $n=261$

Table 14. Community Categorization vs. Primary Practice Location (French Respondents) (n=56) from exit survey.

EXIT	Primary Practice Location			
Community Categorization		South	North	Total
	Within FC	22.2% (4)	92.1% (35)	69.6% (39)
	Within NFC	77.8% (14)	7.9% (3)	30.4% (17)
	Total	100.0% (18)	100.0% (38)	100.0% (56)

$\chi^2=25.006$, $df=1$, $p<0.001$, $n=56$

11.0 ACRONYMS

CAs: Census Agglomerations

CDs: Census Divisions

CBS: Cased Based Sessions

CCC: Comprehensive Community Clerkships

CCFP: Certification in the College of Family Medicine

CFPC: College of Family Physicians of Canada

CLS: Community Learning Sessions

CMA: Canadian Medical Association

CMAs: Census Metropolitan Areas

CPSO-AMRS: College of Physicians and Surgeons of Ontario Annual Membership
Renewal Survey

CPSO: College of Physicians and Surgeons of Ontario

CRaNHR: Centre for Rural and Northern Health Research

CSDs: Census Subdivisions

FCFA: Fédération des communautés francophones et acadiennes du Canada

FLS : French Language Services

FP : Family physician

FSA: Forward Sortation Area

GP: General practitioner

ICE: Integrated Community Experience

MIZ: Metropolitan Influenced Zones

MOHLTC: Ministry of Health and Long-Term Care

NOSM: Northern Ontario School of Medicine

OMA: Ontario Medical Association

PHC: Primary Health Care

RCPSC: The Royal College of Physicians and Surgeons of Canada

REB: Research Ethics Board

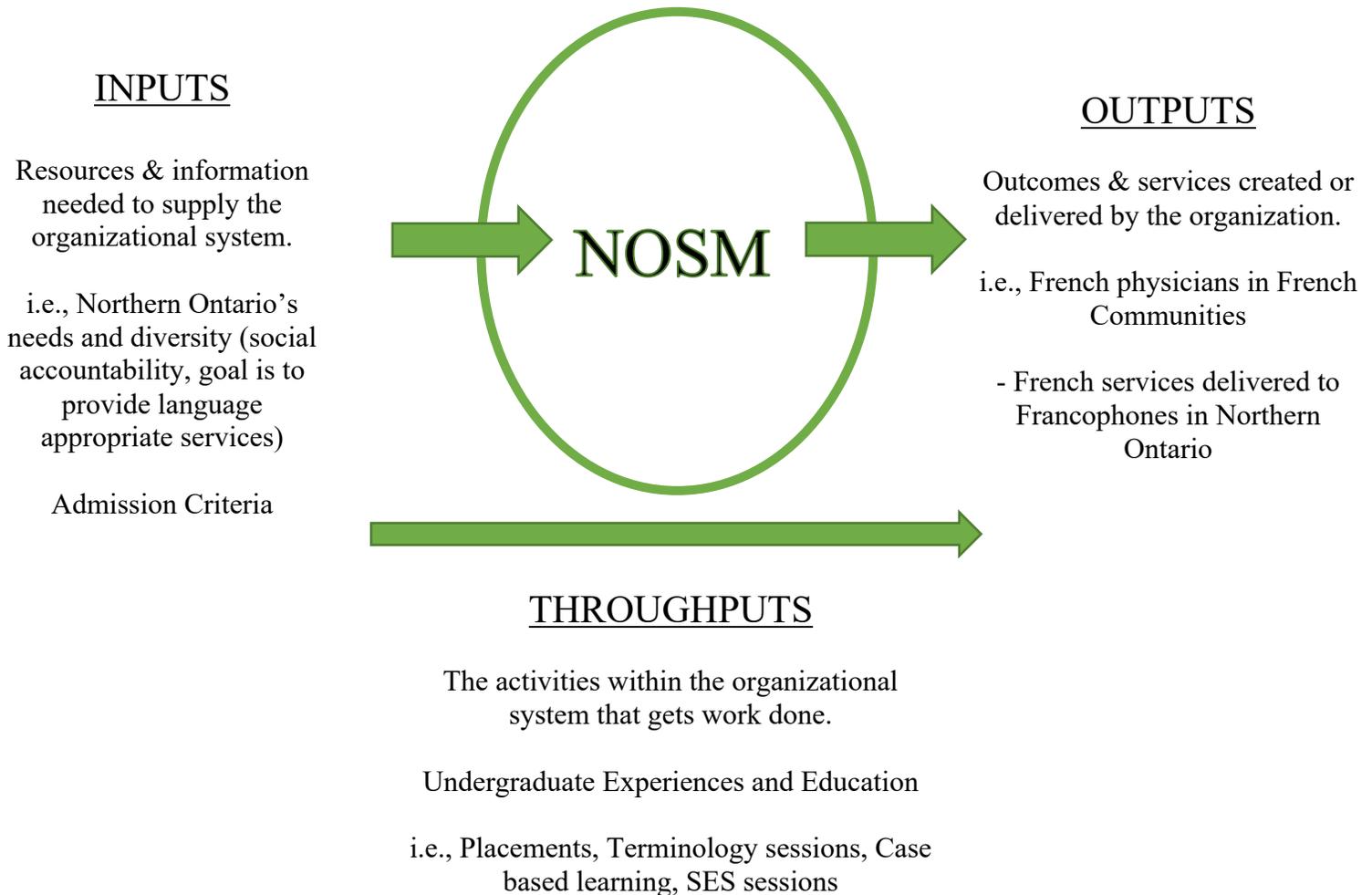
SCS: Structured Clinical Skills

TS: Centre for Rural and Northern Health Research (CRaNHR) Tracking Study of
Northern Ontario School of Medicine (NOSM) medical learners' and residents
WHO: World Health Organization

12.0 APPENDICES

Appendix A- Project Framework.

Appendix A: Open-systems theory of organizations. (NOSM)



Appendix B- Approval for conducting research involving human subjects



APPROVAL FOR CONDUCTING RESEARCH INVOLVING HUMAN SUBJECTS
Research Ethics Board – Laurentian University

This letter confirms that the research project identified below has successfully passed the ethics review by the Laurentian University Research Ethics Board (REB). Your ethics approval date, other milestone dates, and any special conditions for your project are indicated below.

TYPE OF APPROVAL / New / Modifications to project / Time extension X	
Name of Principal Investigator and school/department	Jacob Bonin (PI), supervisor, Alain Gauthier, co-supervisors, Elizabeth Wenghofer and John Hogenbirk, School of Rural and Northern Health
Title of Project	NOSM’s Social Accountability Toward Northern & Rural Communities: An analysis of French speaking students from entry to practice
REB file number	6017192
Date of original approval of project	February 27, 2019
Date of approval of project modifications or extension (if applicable)	February 10, 2020 March 10, 2021
Final/Interim report due on: <i>(You may request an extension)</i>	February 10, 2022
Conditions placed on project	

During the course of your research, no deviations from, or changes to, the protocol, recruitment or consent forms may be initiated without prior written approval from the REB. If you wish to modify your research project, please refer to the Research Ethics website to complete the appropriate REB form.

All projects must submit a report to REB at least once per year. If involvement with human participants continues for longer than one year (e.g. you have not completed the objectives of the study and have not yet terminated contact with the participants, except for feedback of final results to participants), you must request an extension using the appropriate LU REB form. In all cases, please ensure that your research complies with Tri-Council Policy Statement (TCPS). Also please quote your REB file number on all future correspondence with the REB office.

Congratulations and best wishes in conducting your research.

Rosanna Langer, PHD, Chair, *Laurentian University Research Ethics Board*