HOW TO ALLOCATE LIMITED RURAL EXPERIENCES AND OPTIMIZE THE ONES AVAILABLE

Problem:
- Greater number of medical students than available opportunities to do placements in rural areas
- This especially affects the 108 and 110 NOSM placements

Questions:
- How do you target limited rural experiences towards students most likely to benefit and serve a rural community in future?
- What is the impact of student placements in a rural underserviced area (for student and community)?
- What support do underserved areas need to still create a positive experience?

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Medical school rural placements around the world

Program	Program type	How students are selected	Placements and length	Outcomes
Rural physician associate program (RPAP) Minnesota, USA Founded: 1971	Mixed urban-rural (Option for 3rd year) (4 yr)	Rural experiences are ***voluntary*** Submit application in 2nd year. Selected based on: ▪ academic performance ▪ indicators of rural background (indicators of rural background include locations of schools attended; home country's underserved and rural status; size of hometown; and three letters from community members supporting the applicant's preferences for rural practice) ▪ indicators of family medicine preference ▪ demographics *Rural communities are actively involved in the selection of 15 applicants they think will be most likely to go to rural communities. (Dunbabin & Levitt, 2003)	▪ Year 3: nine-months in rural community	▪ 82% of RPAP graduates have chosen primary care, and 68% family medicine. ▪ Of those currently in practice, 44% have practiced in a rural setting all of the time, 42% in a metropolitan setting and 14% have chosen both, with more than 50% of their time in rural practice. ▪ Rural origin has only a small association with choosing rural practice ▪ As of 1988 - After 16 years of the program, all 87 counties in Minnesota have an acceptable ratio of general physicians for the first time in the state's history. (Halaas & Gwen, 2005; Halaas et al, 2008; Verby, 1988)
WWAMI – Targeted Rural Underserved Track (TRUST) Western USA Founded: 2008	Regional/ mixed urban-rural (4 yr)	***Voluntary*** application to track prior to medical school (separate application and interview). Then ***non voluntary*** rural experiences within track. Students complete a secondary application that includes (Greer et al, 2016).: ▪ Size of home community ▪ Essay about intention towards rural practice Selection based on: ▪ Applicants background and behaviours that predict a return to rural underserved practice ▪ Interview addressing applicants' knowledge and experience with rural or underserved medicine as a career and likelihood of applicant working in a rural practice	▪ Year 1: one-month in their TCC site ▪ Year 2: all training at urban site. Encouraged to visit TCC site ▪ Year 3: 18-23-week rural longitudinal integrated clerkship (called WRITE) in their TCC site ▪ Year 4: encouraged to complete elective at TCC site *TCC: TRUST continuity community (population 1,000 – 30,000) (Greer et al, 2016).	▪ Too early to assess success. Informal expectation that students will return to home state ▪ Previous, regional specific program, showed that "from 1996 to 2005 the percentage of UWSOM students entering primary care residencies dropped from 60% to 30%" (Greer et al, 2016).
Northern Ontario School of Medicine (NOSM) Ontario, Canada Founded: 2005	Stand-alone rural (4 yr)	Rural experiences ***not voluntary*** Apply after undergraduate degree. Selection based on combination of: ▪ Rural background as per standardized scoring system ▪ Resume ▪ Standardized questions ▪ Interview	• Year 1 and 2: three-month rural. Indigenous placements • Year 3: eight-month longitudinal clerkship in rural to small urban center	• 62% of NOSM graduates have chosen family practice (predominantly rural) training. • 94% of the doctors who completed undergraduate and postgraduate education with NOSM are practising in Northern Ontario. • The socio-economic impact of NOSM included: new economic activity, more than double the School's budget; enhanced retention and recruitment for the universities and hospitals/health services; and a sense of empowerment among community participants attributable in large part to NOSM (Strasser, 2016)

Program	Program type	How students are selected	Placements and length	Outcomes
James Cook University (JCU) Queensland, Australia Founded: 1999	Stand-alone rural (6 yr)	Rural experiences ***not voluntary*** Students selected from high school. Selection policy combines (Ray et al, 2015): ▪ rurally adjusted academic achievement ▪ written personal statement demonstrating attributes relevant to rural medical education ▪ panel interview scores	Minimum 20 weeks of placement in small rural or remote towns	• "At graduation, almost nine in ten graduates intended to practice outside capital cities (one-third of graduates from elsewhere) and just under half intended to work in rural towns or small regional towns and centers (population <100 000) (one in six from the comparator schools)" • "At graduation had a greater career interest in general practice and rural medicine compared with graduates from other Australian schools, although not in comparison with other Queensland schools, suggesting that the more decentralised Queensland context may be different" (Gupta, 2013)
Rural Clinical Schools (RCS) 14 Australian schools involved Founded: 2000	Varied	Rural experiences are ***voluntary.*** Application and selection depend on school	1 year	• 23.3% of students who participated in extended RCS placements were practising in a rural area vs 13.8% of students who did not participate in extended RCS placements • 34.0% of students with a rural background were practising in a rural area vs only 11.2% of students with a metropolitan background • students with a rural background were 4.1 times more likely to be practising in a rural location and students who participated in extended RCS placement were 1.9 times as likely to be practising in a rural location. After rural background was controlled for, students who attended an RCS were 1.6 times more likely to be in rural practice (McGirr et al, 2019)
Ateneo de Zamboanga University School of Medicine Philippines Founded: 1999	Stand-alone underserviced area	Underserved experienced ***not voluntary***		• by 2011 more than 160 students had successfully graduated • >80% practicing in the local underserved regions (national average of 68% of Philippine medical graduates practicing overseas) • 55% increase in the number of municipalities in Zamboanga with a doctor. Since the ADZU SOM's inception in 1994, the infant mortality rate in the region has decreased by approximately 90%, compared with a national change of approximately 50% in the same time period. (Cristobal, 2012)

Factors that influence future rural practice

1 - Individual student factors

- **Rural Background:** Lots of studies supporting this as one the most important factors (Brooks et al., 2002; Dunbabin & Levitt, 2003), but also studies noting that urban students can also show interest and serve rural communities in the future when given rural opportunities (Lampe et al, 2019).
- **Rural interest prior to medical school:** Premedical mindset to practice rurally and/ or with underserved populations (Myhre 2015; Ko et al, 2005), or an interest in rural medicine early in medical training is one of most important factors to predict later practice in rural setting (Mitra, 2018).
- **Nature of student and personality factors:** Nature of students choosing to study in a rural location is have greater impact on career choice than the experiences during medical school. Value of rural experiences are to further authenticate belief systems (Somer et al, 2012). Students participating in a rural stream were shown to have significantly lower levels of perfectionism and higher levels of cooperativeness compared to non-rural stream classmates (Diann, et al, 2019)
- **Other factors:** completion of school in a rural community, being older, being in a long-term relationship, having a societal orientation, and desiring a varied scope of practice predict post-residency rural family practice. However, these variables were much less important predictors than a stated interest in rural FM (Mitra et al, 2018)

2 - Rural experiences during medical school

- **Rural experiences during medical school:** rural experiences had positive influence on interest in setting up practice in a rural area. How experience was defined varied. For example, taking rural elective (Campbell et al, 2019), participating in ROMP week (Lampe et al, 2019), undergraduate and postgraduate rural training (Myhre, 2015), and participation in RMIG [matter more than school attended in Ontario] (Blau et al, 2009). Not many studies looked at where the students actually ended up practicing.
- **Student satisfaction with rural experience:** Student satisfaction seemed important. Students satisfied with their placement were 2.10 times more likely to have rural/remote practice intention than their counterparts (Fatima, 2018). Negative rural attachments were worse than no attachment at all in shaping students intended practice locations (Dunbabin & Levitt, 2003). Again, not clear on the actual impact of future practice.
- **Length of rural experience:** most literature support longer rotations as more important for influencing future practice. Length of rotation needed varies, for example, greater than 2 weeks (Fatima et al, 2018), greater than 4 weeks (Denz-Penhey et al., 2005) and longitudinal clerkships (O'Sullivan et al, 2019; Campbell, et al, 2019; Ko et al, 2005). One reason why a longer rotation is preferred is because student prefer 1 home base (Denz-Penhey et al., 2005). Also important for students who do longitudinal clerkships to have additional rural training which average a total duration of 2.0 years (Campbell, et al, 2019)
- **Voluntary rural placement:** No direct study comparing outcomes between voluntary vs mandatory rural placements, and many studies are confounded, by the fact that interested students self-select for rural experiences. One study suggests: "Voluntary rural placement positively impacts health professional students' feelings towards rural practice. Decision to choose a [rural clerkship] is a marker of rural career intention and a positive rural training experience for students of both rural and metropolitan backgrounds" (Walters, et al, 2016).
- **Rural experiences embedded in urban programs:** "Rural rotations embedded in an urban-based program appear to be a resource-intensive mechanism to achieve the desired objective of increasing the supply of rural physicians" (Malhi, et al, 2019)

3 Other factors

- **Financial incentives:** One study noted economic forces, such as debt repayment and financial incentives, were one reason why urban students pursued rural practice (Myhre, 2015).
- **Rural postgraduate training:** This is not very widely practiced outside Canada. Australia and New Zealand focus their efforts on undergraduate training. The USA has some rural post graduate programs with variable success (Talley et al, 2011) and Australia notes it as an important factor to influence urban students (Myhre, 2015). Impact of rural training (ex. length, student background) again seems to impact success. One study suggested that undergraduate rural training raises the possibility of future rural practice, while postgraduate training confirms the intention (Malhi, et al, 2019).

4 - Combination of factors

- "No single strategy is likely to be successful. Rather, multiple strategies are required at different levels of education and training each of which have a small effect and contribute to an overall substantial change" (Barer ML, Stoddart GL, 1992).
- Different combos suggest better outcomes. For example, combo of rural experience and pre-rural experience equal more likely to return (Kapanda et al, 2016). Also, long rotations better, rural origin and rural intention are predictors of rural practice and are amplified by rural rotations, cultural and personal satisfaction that is an additional driver in the decision to choose rural practice (Malhi, et al, 2019)

Rural experiences as perceived by students

Why students apply for rural placements

- Expectation they will receive broader and better clinical and academic learning in rural setting (Denz-Penhey et al., 2009). To have greater access to patients (Krahe et al, 2010)
- To have an opportunity to live in a different place (Denz-Penhey et al., 2009)
- Friends and academic reputation (Krahe et al, 2010)

Reported student challenges with rural experiences

- Isolation (Fatima et al, 2018).
- Distance from friends, partners and family (Fatima et al, 2018)
- Internet

Factors which contribute to a positive rural experience

- **Mentorship:** This was mentioned during my ROMP meeting. They suggested that consistent mentorship can overcome otherwise poor "hostmanship." One to one model changes experiences dramatically for students in large group setting for clinical education training. I could not find literature to support this.
- **Student's perception they are useful**: One study indicated this was a huge factor in determine if the experience was positive or negative ("they seem happiest when given lots of work and responsibility"). Students were involved in the trichiasis program and diabetic retinopathy screening, were motivated by their experiences to learn more about trachoma, diabetes and eye health through reading and attending ophthalmology clinics in their own time (Mak & Plant, 2001).
- **Multifaceted components:** "hands-on learning and multidisciplinary exposure is an essential feature; living with other students; social interaction is an essential component of rural placement experience to learn about the beliefs, practices, and health issues of the community; needs to focus on socializing health care students into rural and remote communities to overcome the contextual barriers, eg, geographic isolation, family and relationship needs" (Fatima et al, 2018).

Feedback from NOSM rural sites

- **Unable to dedicate time to teach:** “A repeated remark from preceptors was that although payment for the work they do is appreciated, their biggest cost is time. For most, the idea of having protected time for teaching doesn’t work as the patient workload is not dealt with and just builds up for when they return to it. The ideal way to provide quality teaching time is to have the community slightly over-supplied with doctors. This enables doctors to develop special interests" (Burton, 2019)
- **Not seeing enough resident level learners:** “It was trainees at this postgraduate level that rural preceptors saw as being the most important. The more remote rural areas complained that too few residents are being given enough exposure to them to become confident working there." (Burton, 2019)
- **Not seeing local benefits of NOSM graduates:** “An expectation has arisen that NOSM will provide every rural community with the physicians they need, and that this will fix their health problems… even after the 12 years that NOSM had existed, this is not yet happening in some of the more remote rural areas." (Burton, 2019)
- **Feeling unequal partnership with NOSM**: “Participants overwhelmingly felt that the relationship was dominated by NOSM’s needs and brought benefits only at the whim of NOSM. Stories included the difficulties that people had faced in becoming NOSM faculty, NOSM’s demands for learner housing and other contributions from the community, the pressure on a small number (often one) of people to do all the work with learners when they were in town, and the sense that NOSM was only there when it wanted learners to be hosted. It was not felt that NOSM particularly cared about the issues that NOSM activities raised such as preferential treatment for this group of visitors (even compared to other visiting learners), disruptions to health services, staff burnout and challenges in planning activities in the health sector without knowing whether NOSM learners would or would not be involved” (Carson & Hodge, 2016).

Summary of findings

How do you target limited rural experiences towards students most likely to benefit and serve a rural community in future?
Studies support selecting students based on a combination of factors including rural background, interest in rural medicine prior to medical school, and interest in generalist practice. Programs have used a combination of strategies to select including, student background, essays and interviews. The timing of student selection is not clear. Some programs select prior to medical school and other select during medical school, but there is no head-to-head comparison of the outcomes. There is some suggestion that if students voluntarily apply this autonomy will further support a positive rural experience. I also think exploring the reason why an individual want to have pursue a rural experience may also be beneficial to understand the true intentions of students and further target those most likely to practice in the future.

What is the impact of student placements in a rural underserviced area for students?
Rural placements appear to generally lead to a student's positive perception of rural practice, and in some cases lead to student practicing rurally in the future. It is more likely that rural-minded students will have their beliefs authenticated by rural experiences, but their initial mindset is the most important. Longer rural experiences have a greater impact than shorter ones, and it is also important that students feel their work is meaningful and have appropriate mentorship. Rural placements do not negatively impact students academically.

What is the impact of student placements in a rural underserviced area for the underserved community?
There is less literature on the impact of the learners on an underserved area, however, there may be literature from developing countries who host Western students. As highlighted by the NOSM rural communities, hosting students can present many challenges such as pressure on limited housing, preferential treatment for learners, staff burnout, and disruptions to health services. Studies from Australia suggest that having learners is essentially a neutral effect, but this appears somewhat debated. One study indicated that financially, preceptors do not neutralize the cost of having a student until 2 months into a placement. In some cases, communities will benefit from students returning several years later as independent practitioners. However, this appears more likely if the student was there as a resident. It is also not clear which communities are more likely to have students return.

What support do underserved areas need to still create a positive experience?
Some issues highlighted with rural experiences is the feeling of isolation, far distance from loved one, and internet. Isolation can be overcome by housing students with other students (not necessarily medical students), and distance from family, friends and partners can be somewhat addressed with reliable internet access and program flexibility. This is especially important in Canada where many learners are older. Older and partnered individuals may also be the ones we wanted to continue to attract as there is some evidence, they are more likely to practice rurally. Antidotally, I have heard from student that they are keen to experience a rural community. While it may be a lot to ask a small community to provide such experiences for short placements, perhaps this is more achievable with longer placements. Investing in mentorship may be also key, but it is unclear what factor make for meaningful mentorship.

Questions going forward?
- Is there a value to a single 1-month placement in a community? Would it be better to have return placements to the same community?
- What are the specific outcomes we are trying to achieve? Increase providers specifically in rural and remote Northern Ontario? Which specific communities and what practitioners are needed? What is type of statistics are we hoping for? How many placements are available?
- Why have certain NOSM rural communities stopped taking students?

Proposed rural student experience selection

When to select students: prior to vs during early training

Method of application: Voluntary application which includes essay, interview and/ or rank of reasonings to pursue. For example:

Rank reasons that apply to you regarding why you want a rural experience
(1 = top reason, X = does not apply)

Reasoning	**Rank**
To prepare for future rural practice	
To assess if I would like to do rural practice	
To explore a different community	
To have more hands-on learning	
To see friends or family in that community	
Because my other medical colleagues are going	
To work with a specific population (Indigenous, francophone, underserved)	
To spend time in my home community	
To have more time to study	
To have more time for extra-curricular activities	
To explore a research interest	
To experience a certain activity	
To work with a certain preceptor	
To become a better practitioner	
To add to my resume	

How to select students:

- Interest in rural practice and/ or generalist practice prior to medical school
- Demonstration of rural interest (RMIG, rural research, rural experiences)
- Understanding of issues in rural communities
- Reason for applying
- Evidence of rural background and/ or rural experience (I don't think this should exclude individuals, but should be considered in application as a whole)

Other comments

- Do not set a minimum number of students for placements. Don't waste placements only place students who are interested. Minnesota program showed
- Set clear expectations for students on what to expect in underserved communities (for example, limited housing, lack of services). Emphasize the need to be flexible – what they look like and provide student experiences. Students should have "pre-departure training" as if they were going abroad for a placement. Students should also be aware of challenges that rural communities experience and why placements are set up (ex. extended placement = more likely to practice rural, and less financial impact).
- Rural communities should have a voice in student selection

Proposed handout for communities

Why students apply for rural placements

- **To see if rural practice is right for them:** For students already interest in rural medicine, rural placements provide a key opportunity to authenticate those values, and lead to future rural practice.
- **To access hand on learning:** Expectation they will receive broader and better clinical and academic learning in rural setting, and have greater access to patients
- **To experience a rural community**

Factors which contribute to a positive rural experience

There are multiple factors which make a rural experience positive and it is likely a combination that leads to a positive perception. Some of these are:

- **Mentorship**: Consistent mentorship can overcome otherwise poor "hostmanship." One to one model changes experiences dramatically for students in large group setting for clinical education training. I could not find literature to support this.
- **Socializing student to overcome contextual barriers:** Around the world, some challenges highlighted by students doing rural placements are feeling of isolation, and distance from loved ones. It is important for students to socialize in the community to help overcome these barriers. Studies have shown students keen to engage in social interaction to learn about the beliefs, practices, and health issues of the community. Students can live with other students (not necessarily medical students) to help overcome isolation.
- **Student's perception they are useful:** One study indicated this was a huge factor in determine if the experience was positive or negative ("they seem happiest when given lots of work and responsibility"). In this study, students were involved in the trichiasis program and diabetic retinopathy screening and were motivated by their experiences to learn more about trachoma, diabetes and eye health through reading and attending ophthalmology clinics in their own time. They ultimately had more positive experiences.
- **Hands-on learning and multidisciplinary exposure**

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