

Supply of doctors to a rural region

Supply of doctors to a rural region:

Occupations of Tromsø medical graduates 1979 – 2012

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Abstract

Background: The aim of establishing the medical school in Tromsø in 1973 was to improve access to doctors and standards of health care for the previously underprivileged rural population of Northern Norway. In this study we examine how the aim of supplying doctors to the north has been achieved.

Material and method: Utilising a cross-sectional design we have analysed 34 classes of Tromsø medical graduates (1979 – 2012) with regard to occupations in 2013 by year of graduation and by successive pools of cohorts.

Results: In 2013 altogether 822 of 1611 doctors (51 %) were working in Northern Norway. . The proportions working in the north for old, intermediate and young cohorts were 37 %, 48 % and 60 % respectively. A geographically uneven distribution of doctors was exposed: In the central county (including site of the medical school) the number of Tromsø doctors per 1000 inhabitants was 3.16, while the corresponding numbers were 1.18 and 0.94 for the two distant counties in the northern and southern parts of Northern Norway. Doctors graduating during recent years tended to start their careers in the north to a higher degree than doctors graduating in previous periods. Among doctors from the older classes a relatively large minority have their end-careers in Northern Norway, with a noticeable inclination for long term work in primary care.

Conclusion: Our results support that the first rural oriented medical education model in Europe established in Tromsø 40 years ago is sustainable, achieving its aims.

Supply of doctors to a rural region

Introduction

In 1968, when the Norwegian Parliament decided to establish a university in Tromsø, an overarching goal was to provide access to academic education for young people in Northern Norway to an equitable national level. Northern Norway, located around and mainly north of the Arctic Circle, includes about 1/3 of the area and 1/11 of the population of Norway, (476 348 inhabitants in 2013). The population is widely scattered, many living in remote communities.

(Figure 1)

A core element of the new university was a medical school with a political aim to improve access to doctors and health care standards for the underserved rural population of Northern Norway. This ambition was embedded in a medical curriculum created by the visionary leadership of the founding dean Peter F. Hjort (1924-2011), (Medical curriculum - Tromsø 1971). A major innovation was that students should train nearly a year outside campus engaged with rural general practices and local hospitals all over Northern Norway (Nordøy 1985; Fønnebø Knutsen et al. 1986; Aaraas & Halvorsen 2014).This constituted a socially accountable profile of the Tromsø programme, which has been internationally acknowledged, and developed into innovative and comprehensive models across the world (Rabinowitz et al 2005; Norris et al 2006; Strasser et al 2013; Sen Gupta et al 2014).

Traditionally, access to the six year medical programmes of Norwegian universities has required only high school education, with school grades as exclusive priority criterion. After the first class started in Tromsø 1973, other criteria have been added including complementary education, work experience and place of origin, still with quite high ranked high school grades as a basic requirement. Today, four medical schools in Norway (Fig. 1: Oslo, Bergen, Trondheim, Tromsø) coordinate applications based on joint criteria. One

Supply of doctors to a rural region

exception is place of origin in the north, which is prioritized for applicants to Tromsø. The reason for this is the so called “salmon effect”, originally suggested in the 1960s by an influential advocate for a medical school in Tromsø, professor Torstein Bertelsen (1923-2008): Doctors (like salmons) tend to return to the geographical area (river) where they grew up (Bertelsen 1963). It has since been confirmed, both internationally and in Tromsø, that rural upbringing is a recruiting factor for medical work in rural areas (Rabinowitz 1988; Tollan & Magnus 1993; Woloschuk & Tarrant 2004; Aaraas & Halvorsen 2014).

This paper follows up on three previous studies tracking the early careers of Tromsø educated doctors up to 2001, which showed that about half of them started their working careers in Northern Norway (Forsdahl et al. 1988; Tollan & Magnus 1993; Alexandersen et al. 2004). Based on historical material including 34 classes of Tromsø medical graduates from 1979 through 2012, we address the following questions:

- 1) Do more recently graduated doctors tend to start their working careers in Northern Norway, as previously shown for their colleagues graduated up to 2001?
- 2) To what degree are doctors who graduated from 1979 through 2001, still working in Northern Norway in 2013?

Material and method

Almost all doctors in Norway (96 %) are members of the Norwegian Medical Association (NMA). The Institute for Studies of the Medical Profession organised under NMA has legal access to its membership register when used anonymously for descriptive and quality improvement purposes. For this study, an anonymous file of all the 1611 still active doctors who graduated in Tromsø between 1979 and 2012 was compiled with the following

Supply of doctors to a rural region

variables: gender, year of graduation, geographical working region (Northern Norway or not) and present occupation (primary health care, university hospital, other hospital, other type of work). Using a cross-sectional design we have analysed outcomes with regard to occupation in 2013 by utilising different pools of cohorts. Firstly, we examined proportions of doctors working in and outside Northern Norway according to graduation year. Secondly, we compared occupations for doctors who graduated between from 1979 and 2001 with those who graduated more recently. Thirdly, we present occupation characteristics for three cohorts (old, intermediate and young) according to rising admission quotas for students from Northern Norway. The admission quotas have been increased over the years from 25 % (1973 - 1978) to 50 % (1979 - 1998) and 60 % (1999 - 2012). The following results were generated using IBM SPSS Statistics 21.

Results

Among the 1611 doctors 822 (51 %) were working in Northern Norway, corresponding to a “Tromsø doctor density” of 1.73 per 1000 inhabitants. At county level the density varied: For Nordland (southern county) it was 0.94/1000, for Finnmark (northern county) 1.18/1000, and for Troms (central county including site of university) it was 3.16/1000. The high figure for Troms was mainly due to employment at the university hospitals, which included the central hospital (Tromsø) and an associated distant hospital (Harstad) representing together a doctor density of 2.27/1000. Figure 2 shows the number of doctors working in and outside of Northern Norway in 2013 for each graduation year since 1979. Overall, the curves demonstrate an historical trend of an increasing proportion of doctors retained in Northern

Supply of doctors to a rural region

Norway from 1979 through 2012. However, temporary declines were observed during 2000 – 2002 and in 2011.

(Figure 2)

The analysis comparing proportions of doctors in two cohorts, those who graduated up until 2001 (n=841) and those who graduated after 2001 (n=770), showed that 46,0 and 56.5 % were working in Northern Norway respectively.

Table 1 gives an overview of the material characterized by proportions of workforce in Northern Norway, females, and types of medical work according to cohorts with different admission quotas for medical students from Northern Norway.

(Table 1)

Among northern working doctors graduated prior to 1985 a particularly high proportion was still engaged in primary health care in 2013 (52.1 %), almost ten per cent above the overall proportion shown in table 1 (42.5 %). Also, for classes who graduated after 2001 the proportion in primary health care was higher among doctors working in Northern Norway (36.4 %) than for all doctors (33.5 %). For doctors in the intermediate cohorts working in Northern Norway a notable finding was the high proportion employed at the university hospital, clearly above the overall proportion (52.4 % vs. 42.4 %). Table 1 also indicates that the overall proportions of female doctors and proportions of doctors working in the north have increased at a fairly similar rate over the years. Calculated for the young cohorts with the highest share of female doctors, the proportions working in the north were close to equal for the two sexes, 59.3 and 60.2 % for female vs. male doctors respectively.

Discussion

A main finding of this study is that 51 % of doctors who graduated in Tromsø between 1979 and 2012 were still working in Northern Norway in 2013. Taking all graduates into account, independently of geographical region of origin, this proportion corresponds well with results from previous studies covering up to ten years after graduation (Forsdahl et al. 1988; Tollan & Magnus 1993; Alexandersen et al. 2004). For young cohorts, including students admitted to the school after 1998 (graduated after 2004), the proportion of doctors at work in the north was 59.7 % (Table 1). This was 10 % above results for the first five classes graduated in the period 1979-1984, when they were examined five years after graduation (Forsdahl et al. 1988). Compared to the evaluation after five years the percentage working in the north up to 34 years after graduation has decreased from 49,1 to 36.8 %. A flux out of the region for end-careers in this oldest cohort of doctors is unsurprising, as most of them have their origin in the southern part of the country. Still the proportion retained in the north is well above the 25 % northern admission quotas for the actual classes.

Study limitations

The cross-sectional design of the study with principally unequal outcomes in different cohorts (early, intermediate and late careers) does not allow for causal inferences or interpretations based on statistical comparisons between the groups. Factors not studied, which have likely contributed to decisions about settling and careers are social and professional influences within and across classes, official regulations and changes in the labour market. For example the temporary reduction in the proportion of doctors who graduated between 2000 and 2002 in the northern workforce (Fig. 2) might reflect a strategic movement out of Northern Norway due to insecurity related to the introduction of

Supply of doctors to a rural region

the new patient list system. In the subsequent years, as positive aspects of the system became clear, the trend changed in favour of careers in Northern Norway. Similarly, the drop among 2011-graduates might be associated with strategic concerns relating to revision of the national employment system for young doctors in internship.

Work in primary care

Choice of careers in primary health care have traditionally been high among Tromsø doctors. In 2013, the proportions working in primary practice in the country as a whole, respectively 42.5 %, 27.5 % and 33.5 % for three cohorts analysed in this study (Table 1), were all substantially above the national average of 23 % (Norwegian Medical Association 2013). Access to post-graduate specialisation programmes in family medicine is equal for doctors from all over Norway, and these programmes may not be the prime trigger for Tromsø doctors' tendency to choose work in northern primary health care. This tendency may rather indicate the effect of a curriculum that fosters co-operation and familiarity with local health care systems during the pre-graduate years. A noteworthy finding in the old cohorts is the high proportion of long term retention in primary health care in the north (52.1 %). This finding, along with the reduction in primary care work in the intermediate cohorts, followed by a rising tendency in recent years, may partially be due to professional and political trends combined with organisation reforms in the different periods. A green wave with positive attitudes towards primary care work in the early 1980s was gradually replaced by a more specialist oriented era. In recent years this has been partially outweighed by adjustment to a new patient list system with predictable terms for work in primary care and general practice.

Supply of doctors to a rural region

Faculty development and population health

Obviously, a sustaining impact of rural medical schools on health care for people in their regions depends on maintenance of the medical school itself. Attracting academics for research and teaching purposes is crucial. The high proportion of doctors employed at the university hospital shows that this has been accomplished to a large extent. In addition, the rural oriented curriculum with ample clinical training off campus implies that many of the northern doctors working in local hospitals and in primary care outside Tromsø are affiliated with the university as part time academics. Over the years the original faculty of medicine has widened its scope and merged into “The Faculty of Health Science” (Gamnes & Rasmussen 2013). Today, the faculty incorporates a series of health education programmes, among them psychology, physiotherapy, occupational therapy, nursing, bioengineering, radiography, and odontology. Several programmes have decentralised modules and are particularly designed to attract students from northern counties. It is evident that this has contributed to recruitment and retention of a number of health professions to Northern Norway (Jensen 2008; Nordbye & Skaalvik 2013). This is in accordance with studies showing that student selection strategies together with distributed non- metropolitan health education are useful for recruitment and retention in rural areas (Dunabin et al. 2006; Straume & Shaw 2010; MacDowell et al. 2013; Sen Gupta et al. 2014). A particular success for the medical school in Tromsø has been the recurring population health studies, launched in 1974 and still proceeding (Jacobsen et al. 2012). This has stimulated continuous, fruitful research activity attracting doctors and scientists nationally and internationally to the north. Moreover, the studies have reinforced the social accountability of the Tromsø faculty through engaging people and health workers in local communities. Official data has shown

Supply of doctors to a rural region

gradually improving health indicators for the population of Northern Norway during the last 40 years (Statistics Norway 2009).

Future challenges

Since around 1990, the global trend towards specialisation and centralisation has had a major counterproductive effect on settlement in rural areas worldwide. Northern Norway is no exception. In this situation the 822 Tromsø doctors working in the north in 2013, on average 1.73 doctors per 1000 inhabitants, make a significant contribution to medical development and health care for the population of Northern Norway. An apparent challenge, revealed through this study, is the uneven distribution of doctors throughout Northern Norway, with a substantially lower density in the two counties furthest from the university campus. This indicates an intrinsic centralisation in Northern Norway. One reason for this may be that doctors who want to complete their specialisation without leaving Northern Norway will have to work for intermediate periods at the university hospital. This applies to several specialist disciplines. When it comes to long-term work, studying in Tromsø may create a particular motivation for employments at the university hospital and in surrounding communities. An on-going revision of the Tromsø curriculum may address the uneven distribution in various ways. Since 2009 about 25 % of the students have completed their two final years away from Tromsø in the southern county (Nordland). They have all lessons and clinical training at the next largest hospital of Northern Norway (Bodø) combined with placements in rural community practices. Positive experiences have inspired a similar plan for a share of students to the northern county (Finnmark) to be implemented during the curriculum revision process. The revision also implies continuous mentoring and more training in primary care settings including all students throughout the six years. How

Supply of doctors to a rural region

this may effect distribution of tomorrow's Tromsø educated doctors throughout Northern Norway remains to be evaluated in future studies.

Conclusion

In recent years Tromsø medical graduates have tended to start their working careers in the north to a greater degree than previous generations of graduates. Among doctors from the older classes a relatively large minority have their end-careers in Northern Norway, with a noticeable inclination for long term work in primary care. Our results support that Europe's first rural oriented medical education model established in Tromsø 40 years ago is sustainable, achieving its aims.

Supply of doctors to a rural region

Practice points

- As a pioneer rural education model in Europe, the medical school of Tromsø has contributed substantially to bring health care up to national standards for people in Northern Norway.
- Successful recruitment and retention of doctors and allied health personnel for work in rural areas is supported by education programs engaging communities and personnel in primary health care as trusted partners.
- Since 1974, continuing population health studies has attracted doctors and scientists nationally and internationally to live and work in Tromsø and the arctic area of Norway.
- An uneven geographical distribution of workforce with a drift towards employments in and around the site of the medical school should be noted and addressed.

Notes on Contributors

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Declaration of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the article.

Supply of doctors to a rural region

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Supply of doctors to a rural region

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Supply of doctors to a rural region

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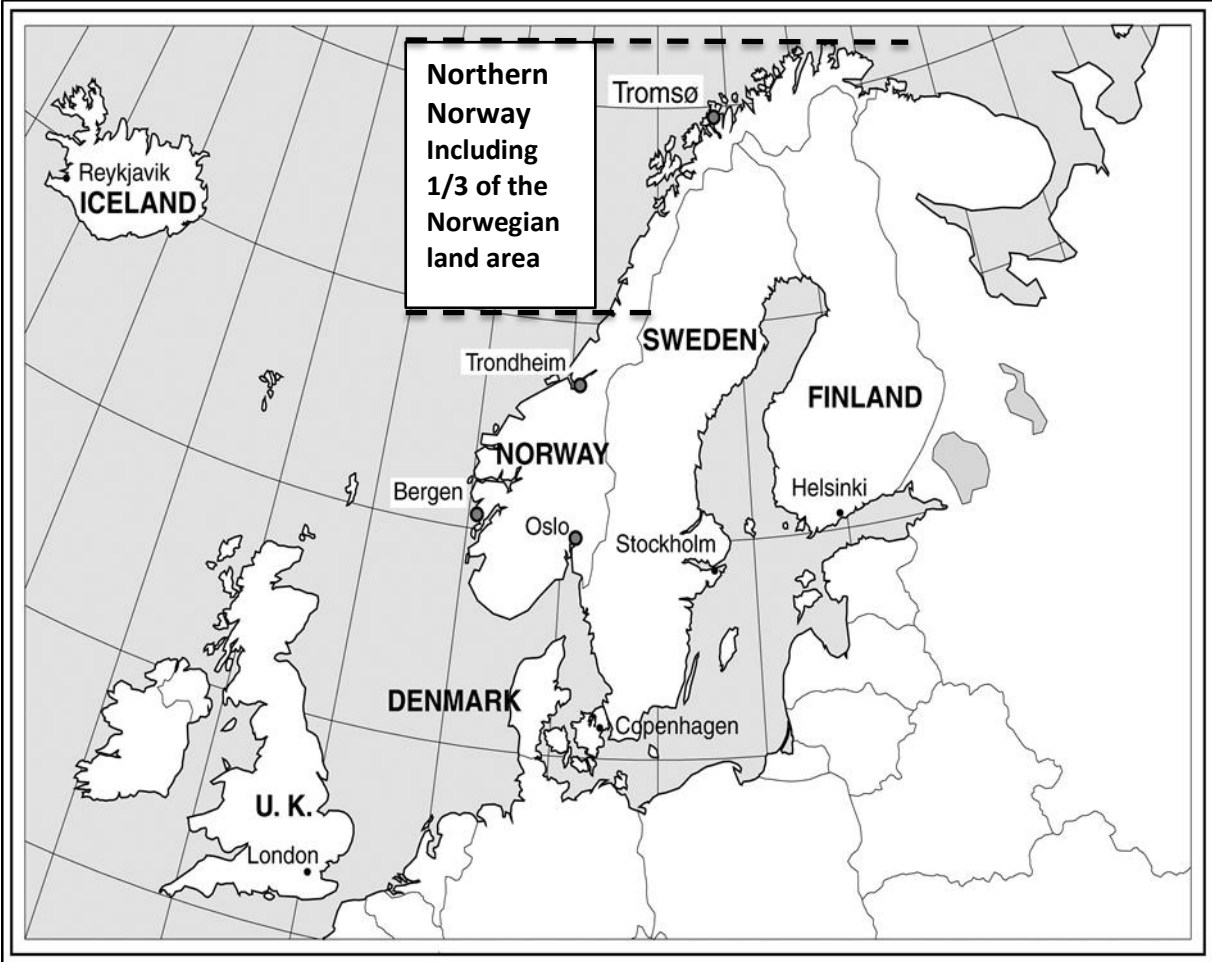
Supply of doctors to a rural region

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Supply of doctors to a rural region

Figure 1 Map showing the location of Northern Norway in Northern Europe, including sites of Norwegian medical schools



Supply of doctors to a rural region

Figure 2. Number of doctors educated in Tromsø 1979-2012, working in and outside Northern Norway in 2013 by year of graduation

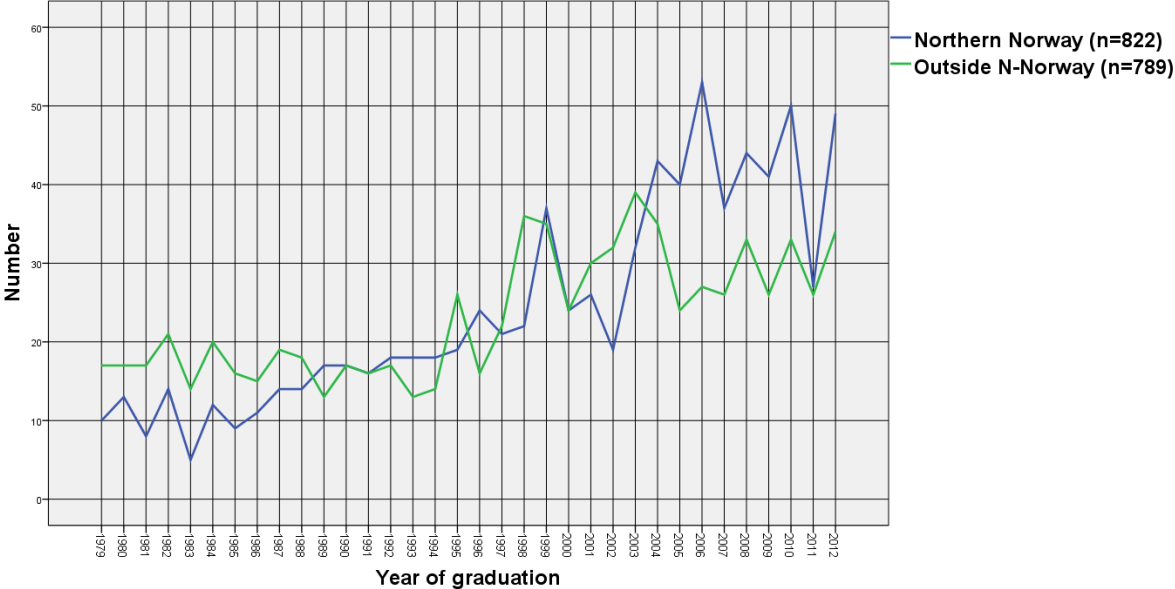


Table 1. Doctors graduated in Tromsø 1979 – 2012 in active work 2013. Proportions of workforce in Northern Norway, females and type of medical work according to cohorts with different admission quotas for northern student applicants

Occupational characteristics	Old cohorts Northern quota 25 %; admissions 1973-1978 n = 193	Intermediate cohorts Northern quota 50 %; admissions 1979-1998 n = 847	Young cohorts Northern quota 60 %; admissions after 1998 n = 571
Work in Northern Norway	36.8 %	48.4 %	59.7 %
Female	34.7 %	52.5 %	61.6 %
Type of medical work			
• Primary health care	42.5 %	27.5 %	33.5 %
• University hospital	24.9 %	42.4 %	34.2 %
• Other hospital	17.1 %	23.1 %	30.5 %
• Other type of work	15.5 %	7.0 %	1.9 %