

Chapter 2.1.4

DEVELOPING RURAL MEDICAL SCHOOLS: THE HISTORY OF TROMSØ AND NORTHERN NORWAY

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Introduction

In 1968, when the Norwegian Parliament decided to establish a new university in Tromsø, a principal objective was to improve the overall access to academic education for young people in Northern Norway. The need for a northern medical school was both a tipping argument for the political decision and a major driving force in the early developing years of this university. The joint establishment of a university and a medical school offered unique possibilities for improving the standards of education and health for the rural and underprivileged population of Northern Norway. These opportunities were grasped enthusiastically by the founding director, Professor Peter F Hjort, and his team. An innovative medical curriculum was created, which included rural practice as a distinctive new component (1).

In this chapter we present and discuss the objectives and achievements of the medical school in Tromsø, focusing on the curriculum, the programme as a whole, the rural placement, health research and population health.

Background and principal objectives

In the years following World War II, the shortage of physicians and health indicators for Northern Norway were distinctly worse than for the southern part of the country. Nevertheless, the idea of a new university in the north was strongly opposed by leading academics in the two existing Norwegian medical schools in Oslo and Bergen. They raised concerns about poor quality of education, and voiced their doubts about the possibility of recruiting doctors and improving health for people living in the north. It was only after a hard struggle and lobbying and advocacy by key professionals, that the decision to build a university and medical

school in Tromsø was made by the Parliament in 1968. The principal objectives of the new medical school were to secure education, recruitment and the retention of physicians in Northern Norway to raise the standards of medical care and health for local people to equitable national standards.

The evidence

In 1968, experience with new models of medical education which also included rural components was practically non-existent. In 1963, however, a leading spokesman for medical education in Tromsø, Torstein Bertelsen, published a study indicating that education of doctors in the rural region where they were born and raised might be essential for recruiting them to work in that area (2). This original study provided a breakthrough in convincing many skeptics in Norway – but since the study was only published in Norwegian, it took time before the results were acknowledged internationally. Later Bertelsen’s core findings have been recognised as the ‘salmon effect’: that students (salmons) return to the region (river) where they are born and bred.

The Tromsø programme was also inspired by other international experiences. Particularly influential were the innovations of the new Canadian medical school at McMaster University, established in 1965, a few years ahead of Tromsø. The McMaster programme included the Northwestern Ontario Medical Programme which was particularly oriented towards the needs of rural and remote regions in the province of Ontario. This successful programme both prioritised applications from students from rural Ontario and secured placement and formal training for the students in northern rural communities (3).

Curriculum

Developed under the leadership of Peter F Hjort, Tromsø had an innovative curriculum which was clearly different from the traditional educational programmes of contemporary medical schools. Like McMaster, the Tromsø curriculum included distinctive new elements such as early contact with patients, organ-based integrated teaching,¹ and co-operation with the health sector in Northern Norway.

¹ Biological, psychological and social aspects of organ diseases (e.g. myocardial infarction) are taught using an integrated approach, ideally with teachers from different specialist disciplines involved in the same learning session.

At the time of the first class held in 1973, Tromsø was the lead among medical schools in Europe with respect to including rural practice as an essential part of the education.

Rural placement

A radical step was the introduction of a tutorial period of almost one year, which involved placements in local hospitals and rural general practices all over the region – and which was compulsory for all students.

Prior to the first time implementation of placements in rural practice, the plan was thoroughly discussed and adjusted together with local physicians and allied health personnel. In addition, seminars with GP tutors and allied health personnel involved in the programme have been held regularly.

The rural practice placement period is eight weeks in the fifth year of a six-year programme. Single students are usually placed in practices, with only very occasionally there being a second in the same practice. During the adjoining 16 weeks in local district hospitals, they are placed together in groups.

Reviewing the programme

The programme has been evaluated annually through questionnaire surveys. Responses have been collected from students and their GP-tutors.

A study summing up the first eight years of training periods in rural practice showed that teachers and students were essentially positive (4). Those who graduated in the latter section of the eight years played a more active and independent role than their predecessors. This may partly explain why young doctors graduating from Tromsø felt more confident in their practical skills than their colleagues educated at a southern university (5).

In 2006, an external expert panel considered rural- and community-based learning to be a particularly successful element of the Tromsø study. The panel advised that this kind of education should be consolidated and reinforced in a future revision of the curriculum.

An overall impression is that the students' learning process is facilitated by giving them trust and responsibility as junior colleagues under supervision. After a short introduction period, the presence of theoretically advanced fifth year students seems not to be an impediment for the running of practice, but rather helpful, as is also indicated in a later study from Australia (6).

Rural placement: The "flagship" of Tromsø

The following comments from Tromsø students in rural practice during 2012 fairly represent evaluations from previous classes since 1979 – and illustrate why the rural placement is often called the "flagship" of medical education in Tromsø:

- *"My tutor was fantastic. It is great to relate to one person who gradually comes to know you, how good you are."*
- *"Got to see many patients with different illnesses. Have removed lumps, and have been called upon when other doctors had something exciting."*
- *"Very rich learning to be the first to assess and conclude, and then getting guidance."*
- *"Part of the time was on call duties, which I found incredibly instructive. The placement in general practice has been the most educational period of the study."*

Recruitment and retention

In accordance with the results from Bertelsen's study, it was decided that a proportion of the students should come from the local area and, in addition, a minor proportion should have a Sami (indigenous) background.² During the first six years the proportion from the north was a modest 25%. In 1979 it had doubled, and since 1998 it has been 60%.

The results of three evaluative studies described below confirm Bertelsen's original hypothesis that students coming from, and educated in, an underserved region tend to be recruited and retained to medical work in the same region to a much higher degree than students from elsewhere.

² The Sami people with their own language and culture were originally living as northern nomads with their reindeer herds. Although the majority of Sami people today have jobs and homes like other Norwegians, still some families are maintaining the traditional nomadic way of life.

Tracking the recruitment and retention of doctors

The impact of medical education in Tromsø on the recruitment and retention of doctors to Northern Norway has been evaluated in three consecutive studies in which several cohorts of students who graduated from Tromsø between 1979 and 2001 were tracked (see Table 1). Using similar retrospective designs, matching data were obtained by collecting information from the doctors themselves, combined with registers kept in the Norwegian universities and in The Norwegian Medical Association (7, 8, 9).

In the first study, key information was collected through direct personal contact with the doctors, which resulted in a response rate of 100%. In the two subsequent studies, using postal questionnaires to the doctors' present addresses, the response rates varied between 84% and 92%. In the third study, similar questionnaires were sent to doctors educated both in Tromsø and in Oslo, the capital of Norway. The figures in Table 1 confirm the original hypothesis of Torstein Bertelsen of a 'salmon effect' in favour of Northern Norway.

Table 1:
Tromsø medical school 1979 -2001:
Northern physician workforce achievements

Study	Main outcomes
1988: <i>Based on five years of graduates (1979-1983)(7)</i>	- 72% of Tromsø graduated doctors from the north worked in Northern Norway - 39% of Tromsø graduated doctors worked as GPs - 36% of Tromsø graduated doctors from the south worked in Northern Norway
1993: <i>Based on eleven years of graduates (1979-1988) (8)</i>	- 82% of Tromsø graduated doctors from the north worked in Northern Norway - 38% of Tromsø graduated doctors worked as GPs - 37% of Tromsø graduated doctors from the south worked in Northern Norway
2004: <i>Based on five years of graduates (1996-2001)(9)</i>	- 75% of Tromsø graduated doctors from the north worked in Northern Norway - 35% of Tromsø graduated doctors worked as GPs - 19% of Tromsø graduated doctors from the south worked in Northern Norway - 7% of Oslo graduated doctors worked in Northern Norway

We have recently obtained updated lists from the Research Institute of the Norwegian Medical Association for the ten classes of Tromsø doctors who graduated from 2002 to 2011. Although not adjusted for the doctors' place of origin, the figures show that of the 696 doctors who graduated in that period from Tromsø, 405 (58,2 %) were currently working in Northern Norway, and 30,4 % of the 405 were in rural and general practices. This confirms previous findings (7-9), that the majority of doctors graduating in Tromsø are retained in Northern Norway, although this was regardless of the place they grew up.

Health research

Associated with the establishment of the medical school, population-based health studies were planned to provide research material for the new academy. These were designed as repeated cross-sectional questionnaire surveys, including prospective follow-up studies of selected population cohorts.

The first *Tromsø study* in 1974 mainly focused on cardiovascular diseases, the major cause of life-threatening illness and death at the time. Following on from this initial study, the population of Tromsø city and selected populations of Finnmark and Nordland counties have been monitored in several studies. Later studies gradually included new health aspects (nutrition, medication, alcohol, cancer, osteoporosis etc.). Over the years, data from these studies have led to a series of scientific papers, PhD degrees and reports (10).

This scientific activity has impacted on recruitment and retention of health personnel in the area in two ways: by attracting competent personnel to fill academic positions at the university and by fostering a favourable milieu for education and guidance of young doctors and health professionals to future clinical as well as scientific work in Northern Norway.

Over the years more health professional education programmes have been added, among them psychology, physiotherapy, occupational therapy, nursing, bio-engineering, radiography, and odontology. In addition a range of other initiatives have also been established in Tromsø - namely a nationwide epidemiological programme for female cancer research, and a number of national research and network centres, among them one for rural medicine (11).

Health improvement

At the outset, an important objective for the medical school in Tromsø was to improve health for people in Northern Norway. Since 1974, the recurring population health studies have been popular. Positive media attention and community engagement have led to a sustained high degree of participation.

The sixth and most recent *Tromsø study* was conducted in 2008. The positive connections between the university and people may have contributed positively to a healthier lifestyle and the gradual improvement of public health indicators observed for Northern Norway. Based on historical data from the National Bureau of Statistics we have been able to provide an overall comparison of mortality rates for Northern Norway and the whole country, and to identify how these have changed from 1973 to 2007 (Table 2). While the clear finding is that the general health of the population of Northern Norway has improved in this period and that the gap is narrowing, the figures remain systematically below those for the whole country. This indicates the need for continuous concerted efforts to promote health and health care for all people in the north.

Table 2:
Age standardised mortality rates for all causes
and a focus on cardiac ischemic diseases
for Northern Norway compared with the whole country: 1973 - 2007 (12)
(deaths per 100 000 inhabitants)

	Total mortality rates			Cardiac ischemic mortality rates		
	1973-1977	1988-1992	2003-2007	1973-1977	1988-1992	2003-2007
<i>Northern Norway</i>	1188	1089	769	374	333	140
<i>Norway</i>	1115	1004	720	328	274	118

Applicability

The success with rural placement in Tromsø has been recognised and adopted by the southern and more urban Norwegian universities. While their placement periods are shorter than Tromsø's, they are popular and sustainable. This was recently demonstrated in one university, where vociferous students protests effectively stopped an attempt by the faculty leaders to discontinue the practice placement.

The historical experiences of Tromsø have also inspired universities and medical schools all over the world to develop new and more radical programmes for rural medical education. Today, the successes with these programmes are returning as an inspiration for us in Tromsø, where our curriculum is in a process of revision and renewal.

Practice pearls

- The history of the medical school in Tromsø demonstrates that rural medical education contributes substantially to improve health care for people in an underserved area.
- Tromsø students, their GP tutors and external experts commonly agree that the rural placement period is particularly useful, and should be consolidated and reinforced in the future.
- We recommend a combination of rural medical education and health studies involving inhabitants of the region. This has emerged as a formula for success in Tromsø.
- We warn against listening to voices with hidden agendas and disapproving arguments to play down rural medical education. (In the 1960s voices inside the academic establishment disapproved of the idea of a new medical school in Tromsø.) Today, there is ample evidence from Tromsø and from around the world in support of the usefulness of rural-oriented and community-engaged medical education.

Conclusion

Since its establishment in 1968, the university and medical school in Tromsø has fulfilled its principal objectives:

- It has contributed substantially to the recruitment and retention of doctors, and has provided better access to medical care for rural and previously disadvantaged northern populations of Norway.
- The health of people in Northern Norway has improved. Better access to education and raised standard of living may be seen as important explanatory factors for this. However, in this larger picture, it is reasonable to suggest that education of academic personnel, not least doctors, at the University of Tromsø has played a positive role, and will continue to do so in the future.

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