

18. December 2013

Report to the Directorate of Health

Research networks in general practices and dental health services

From the Steering Committee for the project:

Leader Guri Rørtveit, AFE Bergen and University of Bergen

Ivar Espelid, TkNN and University of Oslo

Jørund Straand, AFE Oslo, University of Oslo

Kristin Klock, University of Bergen

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Summary

In December 2012 the Steering Committee was commissioned by the Directorate of Health to investigate the basis for creating research networks in general practice and dental health services modelled on research networks abroad.

The Steering Committee appointed two Working Groups, one in medicine and one in dental health. Extensive investigative work has been undertaken during 2013, with field trips, focus group study, a literature review and a pilot study, in addition to meetings and report writing. This report is our response to the Directorate of Health.

We recommend the establishment of research networks based on the model from Scotland, with a common central network functioning as a coordinator. Furthermore, we propose the creation of four local networks in general practice and one local network in dental health services. The local networks will not be geographically localised, but regional for general practices and national for dental health services. We suggest that approximately 50 general practices (approximately 150 GPs) should be associated with each of the general networks, and about 100 dental clinics (around 300 dentists) affiliated to the dental health network. We propose that initially only two local networks in general practice are created, with expansion to full operation in about 2020.

The operation of the fully developed model (central network + four local general practice networks + one local dental health network) is estimated to cost about 37 million Norwegian kroner (NOK) annually. Operation of the start-up model (central network + two local general practice networks + one local dental network) is estimated to cost about 25 million NOK annually. These estimates of the costs are relatively uncertain and imprecise, but the costs will be of this order of magnitude.

We propose an implementation plan, with detailed and grounded planning, during 2014 and initial start-up of the networks in 2015.

Efforts to establish research networks in the two services are a response to current and future challenges in the development of knowledge for primary healthcare services and dental health services. In this report a common understanding that more research and interactions are needed in both dental health and general practice is assumed. The logistics of data collection in these decentralised services are particularly demanding and research needs to be enhanced with respect to scope, quality and clinical relevance. A research network, as outlined in this report, would provide a significant tool towards achieving this goal.

Background

Clinical research in the fields of general practice and dental health in Norway is of very limited scope. The Norwegian Research Council's evaluation report from 2012 recommends increased investment in both these fields. In 2010, the combined Norwegian research environment within general practice along with key players in clinical research in dentistry asked the Ministry of Health and Care Services to support a study of research networks in order to improve research support within these fields. In 2012 the Norwegian Directorate of Health granted a budget of 1 million Norwegian kroner to launch such an investigation that would culminate in a report by the end of 2013.

In the White Paper 18 (2012-2013) «Long lines - knowledge provides opportunities», it is stated that: *"To strengthen research in local government, including the municipal dental health services, it is important to establish closer cooperation with universities and colleges."* In White Paper 13 (2011-2012) «Education for welfare: cooperation in practice» it is stated that the interaction between education, research and professional practice should be strengthened and that the knowledge base must be strengthened through practice-research collaboration between educational institutions and the field of practice. Furthermore, in the White Paper 10 (2012-2013) «Good quality - safe services. Quality and patient safety in health care services» it is noted that: *"Research networks across sectors are a tool for supporting research in the healthcare sector and in dental health. For example, such networks are important in translational research (from basic to clinical research)."*

In the National Health and Care Plan (2011-2015) it is stated (p. 103): *"In several of the municipal health service areas, research activity is currently low. This applies to, for example, general practice research and development. In the proposed municipal health and care law it is recommended that municipalities shall have responsibilities related to research for and about the community health and care services, and that research should be included in agreements between local authorities and health trusts. Responsibilities in participation may include making data available that has been obtained from the service in the municipality, or highlighting current issues and research needs. The responsibility will not require that the municipalities themselves must initiate or fund research. Increased research activities will be an important factor in strengthening recruitment to the community health services. Research should primarily be conducted in collaboration with universities and colleges and other research institutions to ensure the quality and concentration of the research. Further consideration must be directed towards examining how research cooperation in the municipal health care services can be coordinated at the regional level."*

Equivalent challenges exist in the dental health services. In the White Paper 16 (2010-2011) / National Health and Care Plan (2011-2015), it is stated that (chapter 5.8): *"Knowledge regarding the dental health of the population must be improved and systematised. More research should be conducted on the causes of poor dental health and for which measures are most effective in prevention and treatment"*. Moreover it is stated that (chapter 8.4): *"There is a need to strengthen the knowledge base in dental health. The Ministry will assess the allocation of responsibility for research, professional growth and knowledge development in the dental health services. Established and planned regional orthodontic competence centres will play an important role in dental health research"*.

In 2013, the Ministry of Health initiated a comprehensive national strategy process for research, education and innovation in health care systems (HelseOmsorg2-process). Sub-reports from each of the five Working Groups are out for consultation (December 2013). In

all the workgroups in which the theme was relevant, there is broad agreement on the need to strengthen clinical research in primary health services. Research networks are highlighted as practical tools to enable this:

In sub-report 2 - Research Quality and Internationalisation:

Development of (...) research networks is interesting and equivalent networks have been very successful in Britain and the Netherlands. (...) (There must) be established centres of research activity in primary care based upon models in the Netherlands and UK (...) for better focus on relevant issues such as the elderly population, polypharmacy, multimorbidity etc.

In sub-report 3 – The Knowledge System:

Research in community health services is also logistically challenging because clinical practice is decentralised, and the data are therefore scattered. (...) Efforts should be made to stimulate the creation of (...) robust networks that connect research and community health services with each other. (...) Such networks can be financed by a combination of state and municipal funds, but stability and reliability are essential. As experience with the networks for the two services is gained, then the networks can be extended to support research in physiotherapy, nursing homes etc.

In sub-report 4 – The Municipal Sector:

In order that high quality research becomes as natural a part of primary health care as it is within the specialist health services, the infrastructure for research within the primary sector must be strengthened. (...) Associated research networks in the health services are important infrastructure, especially for patient-related, clinical research. Experience from a number of countries that have already established such networks confirms this.

Our work to establish research networks in the two services is therefore a concrete response to current and future challenges in the development of knowledge for and in primary care and dental health services. In this report, we assume a common understanding that we need more research and collaboration in both dental health and general practice, that the logistics of data collection in these decentralised services are particularly demanding, and that research needs to be augmented in terms of scope, quality and clinical relevance. Research networks will be important tools to achieve this goal. It is therefore necessary to have public support for the development of research infrastructure for these dental and health services.

About the professional work environments

Dental health services and general practice have considerable differences from each other with respect to organisation, foundation, and academic matters. An important similarity is, however, that both doctors and dentists are healthcare professionals with an extensive education, the services have strong public funding (for anyone below 18 years for dental services), and, at the same time, there are a considerable number of private practitioners in both fields. In both services there is a lack of systematic collection of practice-related data for use in continuous quality improvement and compiled for use in research.

The general practice research units (AFE) are organised as part of the research groups at universities, except for in Bergen, where the unit is organised into Uni Research, a research institute owned by the University of Bergen. All four units are co-located with the general practice departments at universities and have extensive cooperation with these. The research units (AFE) and general practice departments have *ad hoc* contact with municipalities through various research projects. Placement of students in general practice occurs through direct collaboration with primary care physicians, and thus there is a good working relationship between these groups. Systematic cooperation with municipalities is more variable. The municipality of Oslo has teamed up with the University of Oslo and made a general agreement to collaborate on research and education. The municipality of Bergen also has a general agreement for cooperation with the University of Bergen.

Dental health care competence centres are municipality-based and are operated by one or more municipalities in cooperation. This means that researchers at the competence centres do not have the same close contact with the research environment at the universities as is found for general practice. In this report we use the term "academic institutions" for those groups that undertake research and education in general practice or dentistry, while still having a solid academic base. To the extent that the competence centres are associated with universities, they are included in this term.

Establishment of the four general practice research units (AFE) and five competence centres in dental health can be considered as a first step in the development of infrastructure to support research in the primary healthcare and dental health services. Research networks will be important as the next step.

Organisation of the investigation

The investigation has been organised by a Steering Committee consisting of two professors of dentistry and two professors of general practice. Since the two health services have some major differences, two separate Working Groups, one for each service, were also established. The two Working Groups have reported to the Steering Committee, and there has been extensive cooperation and communication between the three groups.

The following activities have been carried out during 2013:

- Meetings of the Steering Committee in autumn 2012, spring 2013, and autumn 2013, together with regular *ad hoc* contact and activity by email
- Working Groups established with written terms of reference
- Meetings within each of the two Working Groups
- Meetings of the General Dental Network, as well as meetings with the respective academic communities to anchor the work in the appropriate academic environments
- Study tour to UK during March 2013, with participants from the Steering Committee, the Working Groups and the Directorate of Health
- Study tour to the Netherlands in June 2013 with participants from the Steering Committee and the Working Group in general practice
- A review of literature focusing on research networks in general practice and dental health services (documented in Appendix)
- Focus group study among GPs about the barriers and incentives for participation in research networks, as documented in a separate report
- A pilot study of dental health services, as documented in a separate report
- Sub-reports from the two Working Groups to the Steering Committee, and submitted to the Steering Committee in November 2013
- This main report submitted to the Directorate of Health in December 2013

Supporting documentation, in the form of sub-reports etc., is supplied with this main report. Significant additional information can be found in these appendices, and they, together with the main report, are an important basis for further investigation.

Organisation and operation of research networks in other countries

(A more complete literature review can be found in Appendices 3 and 4)

Practice-based research networks have been in operation for several decades in UK (Sullivan 2007, Thomas 2006), the Netherlands (vanWeel 2006), and USA (Peterson 2011, Terney 2007). Newer networks can be found in several countries, including Australia (Soos 2010), Canada (Birtwhistle 2009) and Ireland (Kavanagh 2010). The main purpose of the networks is to facilitate practice-based research, but education, quality improvement and implementation of research-based knowledge are also important goals for several of the networks (Mold 2005, Rhyne 2011). Networks in UK and USA are specifically oriented towards clinical studies of diagnosis, treatment and practice improvement, while networks in the Netherlands and Canada are largely oriented towards observational and epidemiological studies based on data collection from patient records.

The primary healthcare services are responsible for about 80 % of all NHS consultations in the UK, and therefore represent a major arena for clinical research. There are now well established research networks in England and Scotland, while in Wales and Northern Ireland such networks are well along the road to becoming established (Sullivan 2007). In USA there are about 100 established and active networks in the primary healthcare services (Bleeker 2010). Burke (2005) describes practice-based networks as a valuable resource for clinical research.

Dental practices can contribute many patients to research. Gilbert describes how a network can be built up and further developed by providing an example from USA in which seven states and three Scandinavian countries were participants (Gilbert 2008).

A study conducted in USA showed that practicing dentists who participated in a network were similar to their counterparts outside the network with respect to demographic factors and factors related to patient mix, but somewhat younger (Makhija 2009). Participants tended to make somewhat more evidence-based choices of treatment and read more peer-reviewed literature than colleagues outside the network (Botello-Harbaum 2013, McBride 2013). Here it is noted that knowledge transfer occurs not only in the direction from research to practice, but also from practice to the researchers' areas. The article also mentions that the clinicians derive some form of benefit from participating in such networks, such as improving collegial contact, enhancing the reputation of their practices, and the patients feeling more visible by participating in such projects.

Thomas and colleagues found that networks with "top down" organisation were beneficial in terms of stability and project support, while the strength of networks with "bottom up" organisation lay in the local ownership of projects and the ability to reflect on practice-related issues (Thomas 2006). Regarding infrastructure, the following elements are essential (Green, 2005):

- A management board, a manager with research expertise, a network coordinator who is responsible for the daily operation and ongoing contact with participating practices, communication channels such as a homepage, newsletters and mailing lists, a membership register, regular network meetings, information and communication equipment for computer networks.
- Access to expertise in statistics and data security.
- In addition, networks intended for clinical studies require research assistants for data collection out in the practices.

Several networks have reported good experiences with practice consultants (practice facilitators) who assist the individual practices in connection with research, implementation of research-based knowledge, and quality of work (Nagykaldi 2006 Nagykaldi 2005). Good information and communication systems are essential for supporting the networks' work (Delaney 2012).

Numerous articles describe sustainable funding as being a continuous challenge (Peterson 2011, Soos 2010, Green 2005, van Weel 2005). In countries where networks are oriented towards clinical research, this is more challenging than where networks are largely oriented towards data collection for epidemiological research (van Weel 2006, Birtwhistle 2009).

Research based on research networks

Collection of data through research networks has been very successful for research in countries where there has been considerable investment in this. In recent years, articles from the UK and the Netherlands have been published in the most important medical journals where data collection has been based on such networks. Such studies are based on key clinical questions in medicine, and provide well-founded and valid answers that can be used because the issues are tested on patients in the very same settings as those in which the results will subsequently be used. Some examples:

- Sullivan FM et al. Early treatment with prednisolone or acyclovir in Bell's palsy. *New Engl J Med* 2007;357:1598-607
- Little P et al. Effects of internet-based training on antibiotic prescribing rates for acute respiratory-tract infections: a multinational, cluster, randomised, factorial, controlled trial. *Lancet* 2013;382:1175-82
- van Vugt S et al. Use of serum C reactive protein and procalcitonin concentrations in addition to symptoms and signs to predict pneumonia in patients presenting to primary care with acute cough: diagnostic study. *BMJ* 2013;346:f2450
- Barnett K et al. Epidemiology of multimorbidity and implications for health care, research, and medical education: a cross-sectional study. *Lancet*. 2012;380:37-43.

Interdisciplinary cooperation between networks provides additional research opportunities. Sheiham & Watt stressed that prevention programmes for common, non-infectious oral diseases (such as caries and periodontitis) should be coordinated with prevention against other chronic lifestyle diseases. They have called this approach "the common risk factor approach" (Sheiham 2000). General practice and dental health networks can have joint research projects based on such a concept, where both epidemiology and implementation of prevention programmes may be appropriate topics. Other potential projects could concern the dental / oral side-effects of drugs. There are many examples of such possible interdisciplinary collaboration on research projects.

The investigatory group's proposal

The remainder of this report outlines our proposals regarding the aim, organisation and funding of research networks in general practice and dental health services. The proposal is based on information obtained from the research literature, study tours and small-scale studies that we conducted as part of the assessment work, as well as extensive knowledge of the users (research and clinical environments) in Norway. At the end of the report we have included a discussion of the most significant uncertainties associated with the organisation and financing.

Purpose of research networks in Norway

Many summary reviews of knowledge conclude that there is a considerable lack of good studies that can provide answers to key questions in clinical medicine and dentistry. In primary healthcare particularly, the knowledge base will often be too weak to allow recommendations about the optimal treatment in many situations. Well-designed clinical studies can provide the answers that clinicians require. The overall goal of research networks is to facilitate good clinical research in general practice and dental health services, with results that can be implemented in clinical practice and thereby improve the quality of services such that the research directly benefits the patients.

In this context, clinical research refers to research at the point of patient care. This may involve the use of both qualitative and quantitative research methods. Research networks will contribute to the implementation of controlled trials of preventive measures, diagnostic methods, and treatment services to patients, and can be used to recruit participants for qualitative studies. Furthermore, such networks can provide data for observational studies through quality assured registration. The networks should be regarded as a national commitment, available for use by all primary health care and dental health research groups in the country.

Specific objectives of the research networks will be to:

- Recruit general practitioners / dentists to participate in clinical trials
- Support the inclusion of patients in general practices and dental health services into clinical trials
- Support data collection practices in on-going clinical trials
- Support retrieval of basic data from the two services, including necessary validation work, for use in research, quality improvement and patient safety work in general practice and dental health services

The extent to which these objectives are achieved will be measurable. In addition, research networks create greater and mutually binding contact between academia and fields of practice, which will promote the implementation of results from research into clinical practice and also improve quality by providing practices with a relevant knowledge base. The networks will also capture relevant questions that arise during first-line of service meeting with patients. In cooperation with the research environments, it will be possible to develop the questions arising from practice into testable hypotheses. Research networks can assist the government by conducting studies of national or international interest when necessary. Municipalities will also be important partners for the development of research projects.

Once the network has become established as a robust and stable structure, there is nothing to prevent the network tasks being extended, for example to support registration research, health services research, quality improvement and education. Research networks should act as tools

to promote clinical point of care research in general practice and dental health, rather than being ends in themselves.

Proposal for the organisation of a research network

We recommend the establishment of a cooperative network with one parent network and five affiliated "branches". This is in line with the Scottish model for research networks. This mode of organisation will minimise duplication, improve efficiency and ensure better cooperation for specific research projects. It is suggested that the five branches are associated with each of the four general practice research units (AFE) and the single dental research community. The general practice networks will have a regional catchment and scope, while the dental network will be national.

It is important that the networks are based in institutions that want to take on a long-term commitment and that have the necessary research skills. Regarding the proposed *dental health* section of the network, currently no particular group or environment has distinguished itself sufficiently to be the obvious base for this part of the network. One possible approach for this part of the network may be to describe the requirements and specifications regarding how the network will function, and then invite relevant communities to apply and determine where is able to offer the best proposal. Thus a group that is in a strong academic environment will count positively, but factors such as risk analysis, structure, and costs will also play a role. The primary concern must be to develop a robust network that is in line as much as possible with White Paper 16 where it is recommended that research should primarily be conducted in collaboration with universities and colleges and other research institutions, to ensure the quality and concentration of the research. Deciding who should develop the requirements and specifications for such an announcement inviting such applications will be part of further planning

The core of the network is, of course, the associated clinical practices. For simplicity, however, we use the term "network" primarily to refer to the new infrastructure to be created for research purposes. Furthermore, we use the term "central network" for the common national overall structure. The term "local network" is used for the five networks that are not necessarily local in a geographical sense, but rather regional with respect to the general practice branch networks and national for dental health services.

A) Ownership

Formal ownership of the network must be studied in more detail in the next phase of the planning process. One possibility is to start with the British model, where the research networks are owned and operated by the National Health Service (which is responsible for the clinical service). A Norwegian parallel would be that the research network is formally owned by the Ministry of Health and Care Services and the Directorate of Health is responsible for following this up by establishing agreements with local academic institutions that will be responsible for developing and operating the networks. This would correspond with the model used for the general practice research units (AFE), which has worked very well. An alternative model is that those who operate the networks also themselves own them. However, this creates challenges in terms of ownership of the central network. A closer examination of formal ownership and delegated responsibilities will be a very important component of the future planning process.

B) Overall structure:

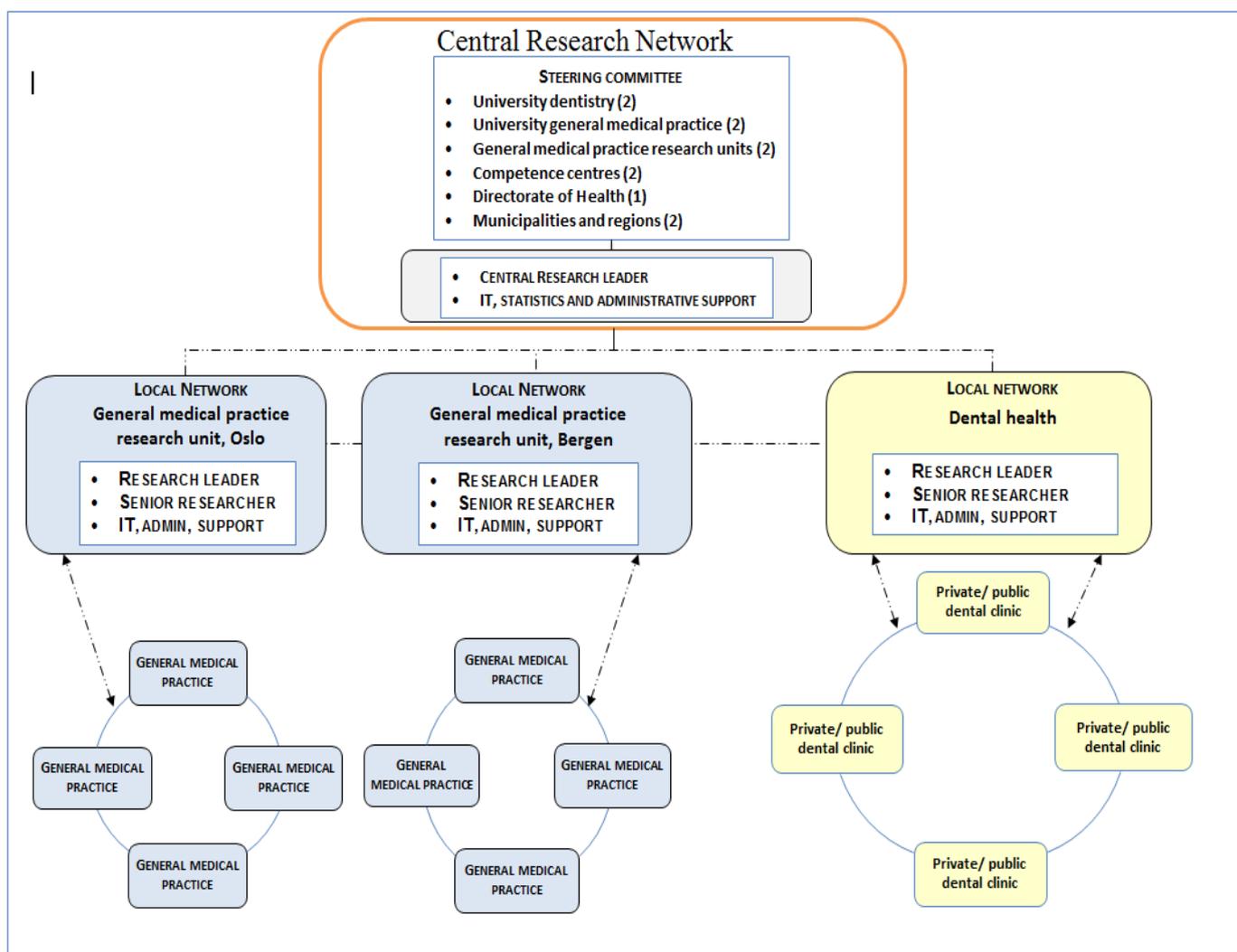
Central research network and Steering Committee

The research networks will require a common overall structure that will fulfill the following functions:

- Common strategy for establishing and operating the networks
- Overall research strategy
- Outreach activities /a common "mailbox"
- Collection of basic data
- Joint information and communication (ITC) systems
- Creation of meeting places between the networks and practices

We suggest that such an overarching structure consists of a Steering Committee and a central research network (see Figure 1).

Figure 1. Suggested model. For clarity, only local networks in general practice in Oslo and Bergen are included. The full model involves corresponding local networks in Tromsø and Trondheim.



The steering Committee should include representatives from professional communities and the owners. A possible composition is outlined in Figure 1. It may be appropriate that the Steering Committee consists of two representatives from each environment, making together about 10 members. Who will lead the Steering Committee is to ensure that the various functions are performed and to have a casting vote regarding research strategy, strategy development, and operational and financial constraint. The Steering Committee should meet 2-4 times annually.

The central research network will be responsible for the final specific objective (collection of basic data), in addition to more strategic tasks. This network will need a research leader (a doctor or dentist with research expertise), as well as a statistician in order to enable full exploitation of the data, together with IT-competent personnel and administrative support. The research network should provide commissions to companies that develop computer programs etc., such that it is unnecessary for the network to develop IT systems themselves. For more on this subject please refer to the section on available resources. The central network should be associated with one of the groups that operates a local network. As the implementation plan (see below) suggests starting with the general practice networks in Oslo and Bergen along with the dental health network, it is these three networks that are relevant for the central network functions. However, the dental health network requires a separate process with an invitation to apply, in order to determine the location of the local network (see elsewhere in this document). Thus, to ensure progress, it will be most suitable to associate the central network with either the general practice research unit in Oslo or the general practice research unit in Bergen.

During further planning the need for a separate **advisory board** attached to the central network should be considered, or whether it will be appropriate to build on existing structures. This will depend on how much funding the network has at its disposable and also the extent to which the network decides upon which projects should be undertaken.

C) Executive structures:

Local network

The local networks will be responsible for the first three specific objectives described. The local research networks for general practice and dental health will appear different from each other in order that they can be adapted to the existing structures (see Figure 1).

For general practice, we propose to create networks connected to the four general practice research units (AFE). These will then recruit practices in each region. For dental health, we propose that this is developed through a planning process. It may be appropriate to invite the relevant groups to develop models, either alone or jointly, which can be evaluated against each other.

To enable the networks to function, the professional community involved must have reached a critical mass in terms of size. The network must be organised with a **research leader** for each of the three "local" structures. For the local network associated with the central network, this person may also be (but not necessarily) the central network research leader. The research leader will be responsible for ensuring that data is assimilated from the practices. We believe there should be several **persons with research competence** connected to the networks in order to create favourable conditions for research. In addition, it is necessary to have a person with **IT-competence** for each network, one **administrative employee**, and research assistants such as **research nurses, research hygienists** or equivalent. It can be advantageous that several of the employees have part-time positions (or Masters positions) at the academic institution associated with the network, such that not everything revolves around full-time positions.

The networks must be closely associated with existing groups, with localisation together and joint hiring of scientific personnel. The competence centres for dental health services must also be closely linked organisationally with the relevant branch of the network, and, if specific requirements are met, they may also be appropriate providers of the network function.

D) The practices

Each network must acquire a portfolio of practices, in which as many as possible of the dentists and doctors in each practice are involved. The number of dentists/doctors associated with each network must be stipulated in the planning process (see section on implementation plan). The Working Group on general practices suggested that around 50 practices should be associated with each of the local general practice networks, that is about 150 doctors. The Working Group on dental health services has described an example in which the dental health network is affiliated with one public clinic and one private clinic in each county, giving a total of 38 clinics. The affiliated clinics should have at least three dentists, and therefore this example would involve around 120 dentists. Dental clinics in the network will have regular contact with 50,000 children and 100,000 adults. In a country with 5,000 dentists, the ambition should be to engage at least 100 practices during the start-up period. There should also be a degree of balance between the two professional networks. In the future it may be appropriate to divide up the dental network into the appropriate sections in order to ensure efficient and transparent operation, similar to that which has been proposed for the general practice network.

In our opinion, making it compulsory for all dentists/doctors in a practise to be involved in a research network will be too strict a requirement. Thus, it should be possible for individual dentists/doctors to participate, but the network should prioritise those practices where more individuals wish to participate. This has implications regarding how compensation shall be organised (for individual dentists/doctors or practices), and this must be investigated further.

Association with the research network must provide benefits to the practices, besides financial compensation regarding additional hours, in terms of access to quality employment, status as an academic practice, credits and other benefits. Please refer to Appendix 5 for further thoughts on this topic. In England a tiered system has been developed that incorporates three levels of association, depending on how actively the practices participate, and has different levels of financial compensation related to the levels of association. This must be studied in detail in future planning.

In addition, all other practices (those which are not permanently associated with the network), both in the region and in the country at large, will be potential partners for projects of larger scope. Practices that participate on this *ad hoc* basis will have to be compensated for the time spent on patient enrolment and academic involvement through quality work, credits and other things, but will not have the same condition of belonging to the established scientific community that the affiliated practices will require. Regarding compensation of practices, please refer to the section on financing.

E) Support groups and resources

Research networks should operate in close cooperation with established environments that can provide support to, contribute towards, and develop collaborative research in different ways. Below is an overview of environments that are important in this context:

The general and dental research groups at universities, general medicine research units (AFE), and competence centres will be the main users of the research network and thus are the most important partners for ensuring that the research networks fulfil their role.

Official health services/management will be key stakeholders in the financing and management of the networks. They will also be able to submit questions to be addressed through research.

The municipal sector is a potentially important partner. Health&Care 21 is a process that is expected to recommend the establishment of regional (or possibly national) points of contact between local government and academia. It is not inconceivable that such a structure could also have the function of providing mandates in relation to research.

NOKLUS (Norwegian Quality Improvement of Primary Health Care Laboratories) has become an important institution in Norwegian general practice. Almost all Norwegian general practices collaborate with NOKLUS, which has very high reputation among Norwegian general practitioners. The academic positions in NOKLUS are organised within the Department of Global Public Health and Primary Care at the University of Bergen and has approximately 60 full-time positions concerned with various quality improvement measures. Among other things, NOKLUS operates the systematic audit, known as the “practice profile”, where they can extract data from GPs. NOKLUS is also responsible for the Norwegian diabetes register for adults. The director of NOKLUS has reported that they are very interested in close cooperation with research networks, both in terms of data collection and monitoring of practices, and also in the development of research projects.

Centre of excellence in medical practice. The Board of the Norwegian Medical Association Central Board has decided to set up such a centre that will support and guide the continuous improvement of care services, organisation and service, while also promoting cooperation within and outside the doctor's surgery. The municipalities are responsible for supporting and promoting quality work at GP practices, usually through the municipal medical Consultant. The Norwegian Medical Association therefore wishes to cooperate with the state and local authorities regarding operation of the centre. The centre is organised as a company with the Norwegian General Medicine Association (NFA), General Practice Association (AF), Private Practice Physicians' Association and the Norwegian Public Health Association as co-owners. It is intended that governmental authorities and municipalities will also join as co-owners and operators of the centre. The Norwegian Medical Association would like the centre to be built up in an environment with general and research expertise. The company's Board will have to decide the location of the centre after its foundation in January 2014. There is considerable potential for synergies between this Centre and the general practice research networks (for example, in terms of data extraction, data processing and feedback to practices).

The General Practice Research Fund is a fund created by the Norwegian Medical Association in which central funding from the Ministry of Health and Care Services to support research in general practice is also administered. The Fund has developed considerable expertise in the assessment of such research, and many general practice research fellows receive their funding from there. The expertise that has been developed in this fund should be drawn upon in the creation of research networks, for example by evaluating the joint use of specialists and other functions. For this, the advisory board must be expanded to include dental expertise.

Mediata og Emetra are commercial companies that should also be mentioned here because they have worked with extracted data and IT support of various types for general research projects, the practice profiles of NOKLUS, and other related work.

UHN (The University Health Network) is a company that works with extracts from dental records and with secure storage of data from different sources.

NIOM (The Nordic Institute of Dental Materials) has as its mission to ensure that medical devices used in dental clinics in the Nordic countries meet health and technical requirements, particularly with regard to developments in this area. NIOM also has considerable research expertise.

Dental Biomaterials Adverse Reaction Unit (UniHealth) is responsible for reporting adverse events, investigating patients, and informing about the side-effects of dental materials. UniHealth also conducts research and development.

Costs and financing of the networks

The annual costs calculated for the *full operation* of the research networks are outlined in **Table 1**. Full operation involves the central research network and five local area networks (four local research networks in general practice and one local network for dental health). One of the local networks in general practice is anticipated as being co-located with the central research network and will therefore require somewhat less resources than the other local networks. Therefore in the table the costs are estimated separately for:

- The central research network
- Four local networks (three in general practice and one in dental health)
- One local network in general practice that is co-located with the central network

The costs calculated for operation in the *initial phase of the research networks* are outlined in **Table 2**. The start-up phase will involve the central research network and three local networks (two local research networks in general practice and one local network in dental health). One of the local networks in general practice is anticipated as being co-located with the central research network and will therefore require somewhat less resources than the other local networks. Therefore in the table the costs are estimated separately for:

- The central research network
- Two local networks (one in general practice and one in dental health)
- One local network in general practice that is co-located with the central network

Table 1. Summary of estimated staffing requirements and annual costs for research networks in **full operation**. May be subject to change following the detailed planning process.

<i>Central network</i>		% Employment	Cost* (1000 NOK)
	Research leader	50	900
	IT-personnel	100	1 200
	Statistician	100	1 300
	Administrative personnel	100	1 050
Sum			4 450
<i>Local networks</i>			
	Research leader	50	900
	Researcher/coordinator	50	650
	IT-personnel	100	1 000
	Research assistant**	50	570
	Administrative personnel	50	525
Sum per local network			3 645
Total sum for 4 local networks***			14 580
<i>Local network assoc. with central network</i>			
	Research leader	50	900
	Researcher	50	650
	Research assistant**	50	570
Sum			2 120
Personnel costs: Total Sum			21 150
<i>Central network</i>			
	IT-costs, operation		1 000
	Travel		200
	Meeting arrangement		1 000
Sum			2 200
<i>Local networks</i>			
	IT-costs, operation		500
	Travel		200
	Miscellaneous		300
Sum per network			1 000
Total sum for 5 local networks			5 000
Running costs: Total Sum			7 200
	Number	Rate	Cost (1000 NOK)
Compensation***	500	15 000	7 500
Operation in practices: Total Sum			7 500
	Number	Rate	Cost (1000 NOK)
Honoraria: clinical studies	500	1 530	765
Honoraria: obs. studies	1000	510	510
Operation of research studies: Total Sum			1 275
Total costs for Research Network: Final Sum			37 125

*Costs incl. overheads etc. ** Assistant can be e.g. nurse or dental nurse ** Local networks: 3 regional general practice networks each with 50 associated practices + 1 national dental health network with 100 associated practices. Also 1 regional network with 50 associated practices, which is co-localised with the central network. This network will have lesser requirements for personnel resources due to synergism with the central network. The costs for this network are in the row below. ***Assumes 4 local general practice networks with 50 practices associated with each and a national dental network with 100 affiliated practices. Assumes flat, low rate for all practices.

Table 2. Summary of estimated staffing requirements and annual costs for research networks in **launch phase**. May be subject to change following the detailed planning process.

<i>Central network</i>		% Employment	Cost* (1000 NOK)
	Research leader	50	900
	IT-personnel	100	1 200
	Statistician	100	1 300
	Administrative personnel	100	1 050
Sum			4 450
<i>Local network</i>			
	Research leader	50	900
	Researcher/coordinator	50	650
	IT-personnel	100	1 000
	Research assistant**	50	570
	Administrative personnel	50	525
Sum per local network			3 645
Total sum for 2 local networks*			7 290
<i>Local network assoc. with central network</i>			
	Research leader	50	900
	Researcher	50	650
	Research assistant**	50	570
Sum			2 120
Personnel costs: Total Sum			13 860
<i>Central network</i>			
	IT-costs, operation		1 000
	Travel		200
	Meeting arrangement		1 000
Sum			2 200
<i>Local networks</i>			
	IT-costs, operation		500
	Travel		200
	Miscellaneous		300
Sum per network			1 000
Total sum for 3 local networks			3 000
Running costs: Total Sum			5 200
	Number	Rate	Cost (1000 NOK)
Compensation***	300	15 000	4 500
Operation in practices: Total Sum			4 500
	Number	Rate	Cost (1000 NOK)
Honoraria: clinical studies	500	1 530	765
Honoraria: obs. studies	1200	510	612
Operation of research studies: Total Sum			1 377
Total costs for Research Network: Final Sum			24 937

*Costs incl. overheads etc. ** Assistant can be e.g. nurse or dental nurse ** Local networks: 1 regional general practice networks with 50 associated practices + 1 national dental health network with 100 associated practices. Also 1 regional network with 50 associated practices, which is co-localised with the central network. This network will have lesser requirements for personnel resources due to synergism with the central network. The costs for this network are in the row below. ***Assumes 2 local general practice networks with 50 practices associated with each and a national dental network with 100 affiliated practices. Assumes flat, low rate for all practices.

The networks' core operations (employment costs and operational costs) must be fully financed by public funds, cf. the research strategy of the Ministry of Health and Care Services, where the Ministry assumes responsibility for facilitating applied research in healthcare. This is equivalent to the National Health Service in UK assuming responsibility for research in the English health services. It can be assumed that other parties that are responsible for the quality of the services might be brought in to contribute towards the financing (e.g. community health services).

Funding must also include compensation for the associated practices. Networks in England have been very successful in offering a tiered range of levels of membership and compensation packages.

In order that the networks become quickly operational, funding that can be applied for to support clinical research should be included in the financing of the networks' core operations. The allocation of such funding can be performed in a variety of ways, but it will probably be most appropriate to use the existing channels that already have experience in evaluating projects in those services (e.g. the General Practice Research Fund). The project applications should also be able to include funds for the compensation of GPs/dentists for the additional work required for the inclusion of individual patients.

By using the networks, research projects from general practice and from the dental health services should also be able to compete for funding from the Norwegian Research Council and other external agencies. In the future, European cooperation could provide the basis for applying for EU funding.

It is clear that such a commitment to research in clinical practice outside the specialist health services will require significant contributions from the public purse. Given the limited resources that are currently available for research in these services, the time is ripe to take action to provide a more equal framework for research throughout the health service. This also conforms to the proposals outlined in the Health&Care 21 process.

Discussion of the proposal

Ownership structure and Steering Group

As stated in the proposal, we believe that the ownership structure, the composition of the Steering Committee and leadership of the Steering Committee are matters that should be examined further during the planning process. We want to emphasise that it is essential that professional communities have good management and close proximity to research networks to enable them to function optimally. We believe that an advisory board that is associated with the central network will also be necessary, but this should be considered during further planning.

Organisation

Our proposal for organisation of the networks is based on experiences gained during field trips to UK and Netherlands, as well as reviews of Norway's geography, population and professional groups. There is clearly a need for a combined unit that coordinates and ensures exchanges of experience between the various local networks. This will also significantly increase the opportunities for interdisciplinary research. As the local dental health network must go through a process to determine its location, we recommend that the central network is not linked to the dental health network. The general practice research units (AFE) in

both Oslo and Bergen would like to build and operate the central research network. Where the central network should be located should be clarified through further planning work.

We suggest that local general practice networks should be located with the general practice research units (AFE) in Oslo and Bergen respectively. Both these research units have participated in the process. Additionally, in a letter to the Ministry of Health and Care Services in 2010, all general practice research environments supported the proposal of research networks. Both units have established themselves as distinct research environments since their inception in 2006 and have extensive academic foundations. For the dental health network, we propose a process of invitations to apply, as it is less clear where the localisation would be most appropriate in terms of expertise and resources to operate such a network.

The number of practices that is estimated to be associated with each of the local networks is based on estimates of access to adequate numbers of patients for various studies. In many contexts it is natural that several networks work together to provide patients for the same study. This, in itself, will create favourable conditions for several national studies.

When the networks are fully developed, the general practice network will be larger than the network for dental health. Thus, planning for the dental health network becoming larger than has been outlined here should be considered.

Cost estimates

In Tables 1 and 2, the annual operating expenses for a fully developed network and for a start-up model are estimated to be approximately 37 million Norwegian kroner (NOK) and approximately 25 million NOK (2013 rates), respectively. The expenses' frameworks are influenced by the staffing structure of the networks and compensation to the participating clinicians. In terms of research networks in other countries, the estimated costs lie within reasonable limits.

A significant proportion of the costs in the proposal is related to personnel in the networks. Based on study tours to existing networks, it can be seen that it is essential that the networks are of sufficient size to function effectively. Employees shall be responsible for large and time-consuming processes such as recruitment of dentists and doctors to the networks, recruitment of patients to studies, assistance in data collection etc. It should also be noted that this would save considerable amounts of time for researchers, who will therefore be able to use their time more effectively on other tasks. Furthermore, we assume that the co-location with existing research centres will enable the joint use of personnel and hence additional costs are reduced in the proposal.

There are considerable uncertainties associated with the estimated costs of operation of the networks. The costs of the necessary IT resources for both the central and local networks are very uncertain. In calculating the estimates, a fixed low rate for practices that will participate in the networks has been assumed. Development of a tiered system in England, with different activities and different compensation rates, has been successful and we would recommend that such a stepwise association should be discussed in the next phase of the planning process. Regarding remuneration of dentists/doctors for participation in observational and clinical studies, the cost per patient included in the study is highly uncertain, as is the number of patients to be included. It would be natural for there to be less activity during the initial phase, but this is a period when we believe that stimulating the research activity will be very important. This could be achieved by providing funds as described (i.e. reimbursement of costs for dentists/doctors participation) or by provision of own funds that are advertised and can be applied for and awarded competitively. These issues need to be examined more closely in the next step of the process.

It is important that the structure of the networks is evaluated during, for example, a three-year period, in terms of whether the dimension and tasks are appropriate. This must be considered in greater detail during the planning process, but the group is already able to warn about problems with networks that are of insufficient size.

Information and Communications Technology (ICT) structure

A significant effort will be required to create ICT support for the network. As far as possible, this should be built upon the expertise and tools that already exist. NOKLUS, Mediata and Emetra will be important environments to draw upon in this respect. ICT development associated with the *Centre for Excellence in Doctors' Surgeries* that will be established in 2014 is also likely to involve synergy opportunities for the general practice research network. We see a need for developing more appropriate procedures for data collection from the electronic medical records in both the dental health field and in general practice.

Standardisation and calibration of the different variables to be recorded and retrieved will also be necessary. Some ICT tasks will be specific to particular projects and some will be part of routine operations and must be managed by the network as part of the infrastructure. The starting point must be based upon the current electronic medical records (EMR) for the two health services, which have somewhat different situations:

The dental health services: The IT structure that is necessary to support dental health services with adequate reports and data extracts for specific purposes is currently lacking. Thus, from a research perspective, using the current system to collect adequate data is very complicated. The EMR system, OPUS, which currently dominates in the dental clinic on a daily basis, is thus far from functional (Meisfjord 2011). User-driven specifications have been prepared and utilized in acquiring the new EMR system for six counties in 2012. In these specifications the functionality that will make it easier to extract data reports and that can also provide a basis for research is described. A new system such as this will thus also be very valuable in future research networks.

General practice: In general practice, the EMR market is divided between 3 to 4 retailers and the individual practices rarely have professional procurers. The development of ICT in terms of EMR for use in GP surgeries has been considerably slower than in many other branches of ICT development. This will also be a challenge for general practice research networks.

Assessment of risk

There are many links in the chain from the patient first encountering the clinician and being recruited into a study, until scientists publish their results. In the operation of the research network there must therefore be built in motivational incentives linked to the various processes of identifying potential patients for a study, recruitment, participation, completion and transmission of quality-assured data to the researcher. Research networks in Norway must build upon the experiences of other countries, but must also have the necessary time to build up their own experience.

It is possible that within the dental health field there are several different groups that would like to operate the network themselves. The National Health and Care Plan (2011-2015) notes that research in decentralised services should primarily be conducted in collaboration with universities and colleges and other research institutions in order to ensure the quality and concentration of the research. It is important that in this situation the specifications of the network can be formulated such that the best possible basis is obtained for selecting the

environment that with the greatest opportunities and willingness to host a good and stable network.

Implementation plan

The investigatory work that we have started here has generated considerable activity and interest in the relevant research communities. We believe that it is important to exploit this positive situation. Academic ownership, commitment, and willingness to contribute are essential factors in addition to funding. In order to maintain the momentum in the process, it is necessary that funding is available in 2014 to continue planning, with a view to developing a more detailed and binding strategy document.

We suggest a rapid implementation plan for the general practice research networks. For the dental health services a national network is proposed, but the support functions should be revised upwards as the size increases.

Step 1

First half of 2014: Appointment of a Working Group with the mandate to prepare a strategy document for research networks in general practice and dental health services. The strategy document rooted in professional circles is prepared.

Step 2

Second half of 2014: The strategy document is anchored in the administration's strategy and budget (State Budget for 2015).

Step 3

First half of 2015: Pilot testing of small networks and technical trials in terms of data retrieval and research.

Step 4

Autumn 2015/winter 2016. Begin creating the infrastructure for the overall (joint) research network and commence preparatory activities, including information activities.

Step 5

First half 2016: Begin creating the infrastructure for the three local networks, recruitment of practices and initiation of studies.

Step 6

2020: Establishment of the last two local general practice networks and possible expansion of the dental network.

Conclusion

Research that can provide relevant answers to important questions of public health significance is scarce in general practices and dental health services. Due to the decentralised nature of these services, data generation and data gathering are very demanding in terms of both logistics and costs.

Research networks are tools that can be used to support practice-oriented research in both these services. Experience from other countries shows that such tools are effective. Research networks will require significant organisational and budgetary support and commitment. Organisational challenges can be solved by professional environments. Funding should be a responsibility of the health authorities. We believe that investment in such an enhancement for evidence-based practice in dental health and general practice will prove to be of value.

Appendices

1. Letter to Ministry of Health and Care Services 2010
2. Application letter 2012
3. Report of working group on general practice 2013
4. Report of working group on dental health services 2013
5. Focus group study - general practice 2013