

Research and innovation in health and care in Norway

Case study – Innovation Policy Review of Norway

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1. Introduction

Research and innovation in health and healthcare is an important and prioritized area in Norway, both in terms of its relative size in the Norwegian research system and in terms of its position in the (STI) policy agenda. The research funded and performed in universities and hospitals has increased significantly, making Norway one of the OECD country with the highest share of R&D in this area. The importance of this area is likely to continue in the future as evidenced by the prominence of related issues in the Long-Term Plan for Research and Higher Education 2015-2024 (LTP). Health and healthcare play key roles in tackling societal challenges (e.g. disease and epidemics, dealing with an ageing population etc.), which was identified as one of three principal objectives of the LTP. Moreover, the area of “public sector renewal, better and more effective welfare, care and health services” was one of the six priority areas listed in the LTP. The government has also launched an ambitious strategy process for research and innovation in health and care resulting in the Health&Care21 Strategy and followed this up by presenting a “Government Action Plan for Implementation of the Health&Care21 Strategy”.

These strategic efforts took place in the broader context of a number of important reforms in the healthcare system in order to improve the organization and provision of specialized healthcare and to improve its efficiency, quality and access throughout the country. .

However, several challenges remain that are not fully tackled by on-going initiatives:

- As in most countries, health research and innovation takes place in a complex system with different key actors under the authorities of different ministries, with strict regulations. These typical framework conditions call for the coordination of the activities of these actors. However, Norway, despite the efforts to provide an overarching strategic framework as mentioned above, is characterized by a weak tradition of coordination, in general and in particular in this area. There are also scarce interactions with healthcare providers at the different levels of the healthcare system as well as with actors outside the narrowly defined realm of health and care (e.g. industry and other private actors, entrepreneurs, social sciences, etc.).
- Although the government has sought to promote innovation in healthcare by funding innovation projects promoting awareness-building and learning platforms, increasing the focus on public procurement as a means of driving innovation and national business development in healthcare, there is no structure for coordinating these various initiatives and diffusing, scaling or robustly testing promising innovations. Innovation in healthcare appears to fall in between the remit of ministries' responsibilities and co-ordination.
- Most innovation projects in healthcare have been generated bottom up, without strong leadership that would enable and promote innovation "from the top".
- Interdisciplinary approaches including the incorporation of social sciences and technological and engineering sciences are limited in the research financed by the regional health authorities, mainly allocated to researchers employed by local hospital trusts. Furthermore, these research projects appear most often bottom-up driven by researchers' interests rather than by the needs of patients and citizens.

The LTP's clear identification of healthcare and the public sector as prioritised areas but also the fact that it linked health, welfare and modernisation have made an important and necessary contribution to advancing research and innovation in healthcare. The development of the Health&Care21 Strategy and the government's action plan has also been instrumental. The focus on municipalities brought attention to the demands for knowledge and innovation in this sector and to the fact that municipalities are important actors in this new landscape of health, knowledge and innovation.

However, the first LTP, to be revised in 2018, has not yet provided a new policy approach to address societal challenges. There have not been significant changes in funding structures or policies and the underlying approach remains science-push, despite the fact that MHCS is the main funding source. Although it aims to provide an overarching, interministerial framework for research and higher education, the LTP has so far mobilised little new funding for tackling these mounting challenges, and there has been little change in the origin and destination of the limited funds. It also lacks concrete actions that would federate the different actors.

The "21-Forum" process in the health area complements the overall strategic framework set up in the LTP and contains encouraging signs of moving away from sectoral compartmentalisation. It is the first step towards the creation of a permanent platform to implement and monitor an holistic approach to addressing challenges. A Health Care 21 Advisory Board is tasked with overseeing the implementation of all the recommendations in the original strategy and providing advice to Ministries and other users. This high-level, multi-stakeholder group has a dedicated Secretariat, funded by the Ministry of Health and Care Services and located at RCN. Against this backdrop, the government has increased its funding for health-oriented basic and applied research and reorganised the health research programmes at the RCN, targeting public health, treatment, development of services and

innovation and global health. The Ministry of Education and Research and the Ministry of Health and Care Services also jointly commissioned a report on the barriers to co-operation between universities and hospitals, which was presented in December 2016.

The revision of the LTP in the 2018 should be an occasion to better link these two strategic endeavours and make the LTP more concrete and holistic, for instance adding wider ranging ‘flagship’ structural and programme-style policy activities, without changing the plan’s general orientation. The health area could be a good candidate for setting up the ‘broad integrated programmes’ recommended in the OECD Innovation Policy Review of Norway (OECD, 2017, see box below).

Box 1: Recommendations for tackling major societal challenges from the OECD Innovation Policy Review of Norway

Devise broad integrated programmes that prioritise addressing societal challenges. These programmes should include features that directly take account of the specificities of societal challenges. They should:

- be based on inclusive processes that engage a broad array of stakeholders, including users, concerned parties and experts, entrepreneurs, local public authorities (and even, for example, artists and immigrants)
- launch studies and initiatives to examine regulatory frameworks, legislation and standards that could facilitate the widespread implementation of solutions to tackle societal challenges
- promote interdisciplinary and multidisciplinary research
- access a wide range of instruments, from specific research and innovation projects (including social innovation) to experimentation and public procurement
- include foresight exercises and agree on strategies/visions that transcend sectoral boundaries and include education, innovation and upscaling.

Align the higher education and technical and vocational and educational training (TVET) system with the competence and skill base needed to address societal challenges.

Invest in translational activities and establish structures for experimentation (including radical/disruptive innovations), as well as for learning and upscaling solutions. This could take the form of policy labs, experimental regulation-free zones, and also assigning selected actors (agencies, ministries, commissions) the responsibility for broader implementation.

Strengthen public procurement for innovation, aiming to address societal challenges and considering other forms of support to demand relevant solutions.

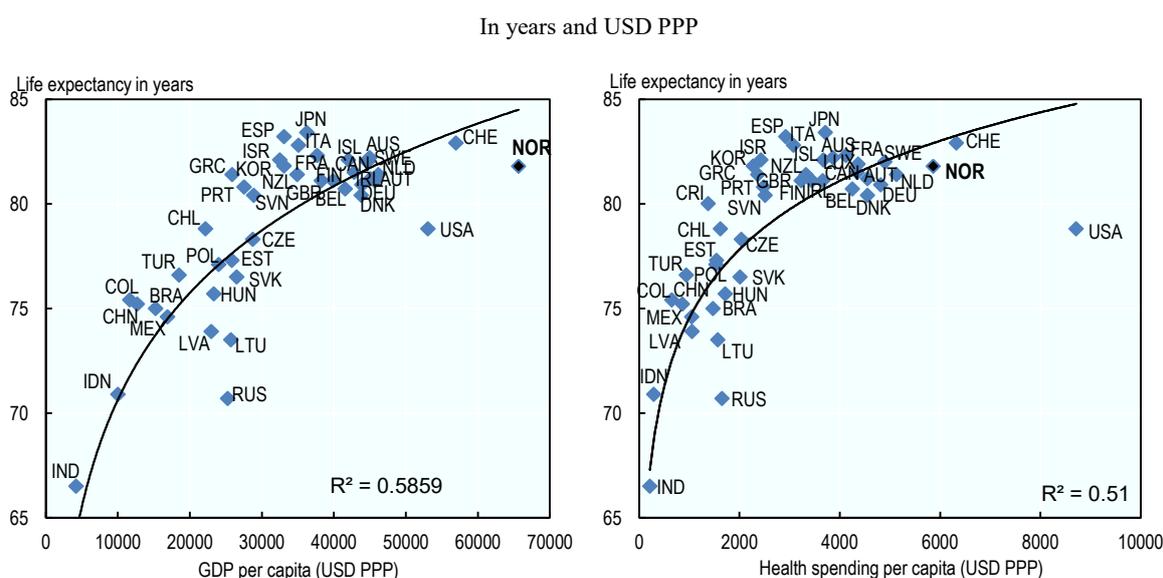
Address governance issues to improve co-ordination across ministries and policy domains of efforts towards solving societal challenges (for example in healthcare innovation).

Source: OECD (2017), *OECD Reviews of Innovation Policy: Norway 2017*, OECD Publishing, Paris. <http://dx.doi.org/10.1787/9789264277960-en>

2. Health at a glance in Norway

Norway belongs to a large group of 25 high income OECD countries led by Japan, Spain and Switzerland in which life expectancy at birth now exceeds 80 years. It is generally found to provide excellent healthcare when measured in terms of survival rates for heart attacks, strokes or different types of cancer. The system performs well not only when compared to the OECD average but also when benchmarked against its natural benchmarks, such as Denmark and Sweden (OECD, 2014). However, it performs less well in terms of waiting times for elective surgery, with longer waiting times than in many other countries for knee and hip replacements or cataract surgery. Although life expectancy is strongly and unsurprisingly associated to the level of income (measured by GDP per capita), the relationship is less pronounced at the highest levels of national income and Norway has lower life expectancies than would be predicted by its GDP per capita alone (see Figure 2.1, left panel). Healthcare is also relatively expensive with Norway having the third-highest expenditure per capita on healthcare in the OECD in 2013 (PPP USD), trailing only the US and Switzerland (see Figure 2.2, right panel).

Figure 2.1. Life expectancy at birth, GDP per capita and health spending per capita, 2013 (or latest year)

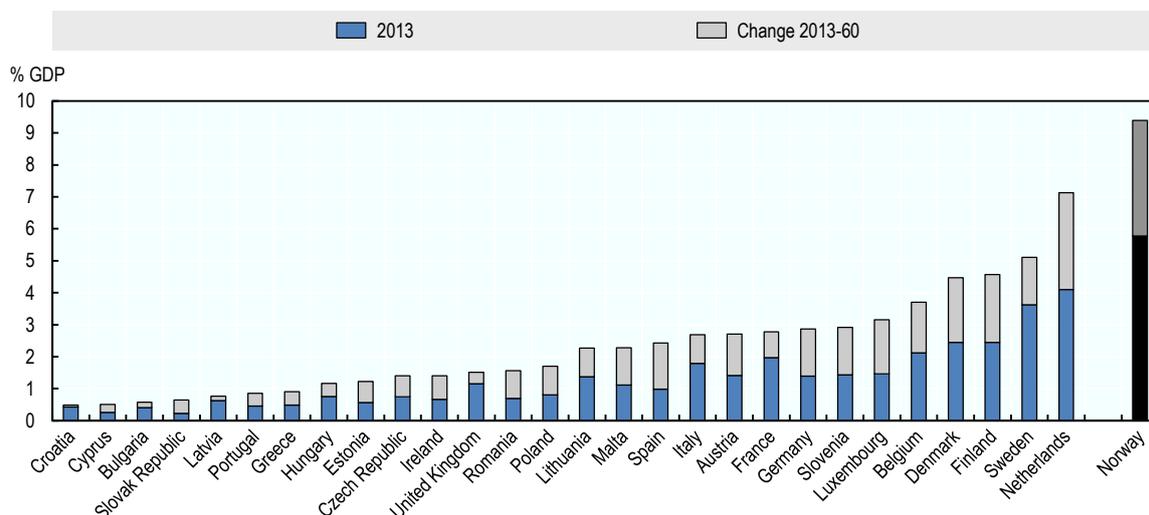


Source: OECD Health Statistics 2015.

Longer life expectancies, when the effect is not compensated by a rise in fertility rate or immigration, imply that older people make up an ever-increasing proportion of the country population. Norway is no exception to this. In a ‘National Health and Hospital Plan’, presented in 2015, the Ministry of Health and Care Services listed a growing and rapidly ageing population – particularly in sparsely populated areas – as key challenges for future healthcare (MHCS 2015a). Although the estimate of the proportion of the population aged over 65 and 80 years in 2050 is far below the level that countries such as Japan, Korea Spain or Germany might reach and their health status today is rather good in international comparison (OECD, 2015a), ageing will have a strong impact on health expenditures, in

particular long-term care. Norway is already the OECD country with the highest long-term care public expenditure as share of GDP after the Netherlands and Sweden.¹ According to OECD projections, Norway could keep the leading position and even increase the gap to other countries in 2060 (see Figure 2.2).

Figure 2.2. Public spending on long-term care as a percentage of GDP, 2013 to 2060



Source: OECD, 2016.

3. Health R&D: public and business research inputs

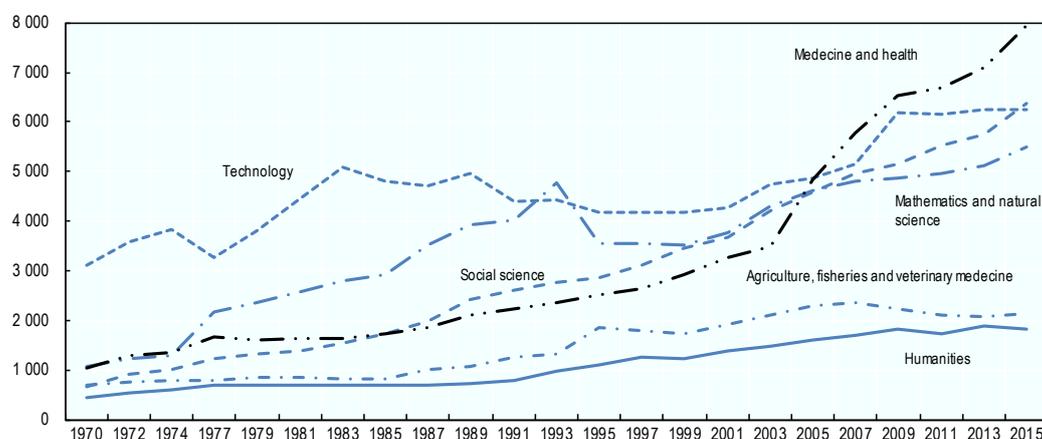
Rising long-term health care costs for ageing populations or the rise of dementia calls for an increase of national efforts dedicated to research and innovation committed to the objective of protecting and improving human health. In 2015, R&D expenditures accounted for 5% of total current expenditures of university hospitals (NIFU).

In recent years, research funding on medicine and health has increased significantly in Norway and, starting in 2003, the increase has been considerably higher than for any other field of science (see Figure 3.1). In 2015, units operating within the medical and health sciences accounted for one third of total current R&D expenditure. Half of these expenditures were executed in university hospitals. In 2015, R&D personnel in medical and health sciences accounted for 37% of all R&D personnel (Full-Time Equivalents) in the Norwegian higher education sector, including university hospitals (NIFU).

¹ In 2013, health component only (hence excluding the social long-term care expenditure) (OECD, 2015).

Figure 3.1. Current expenditure for R&D to higher education and institute sector according to field of science, 2015 prices

In Million NOK.

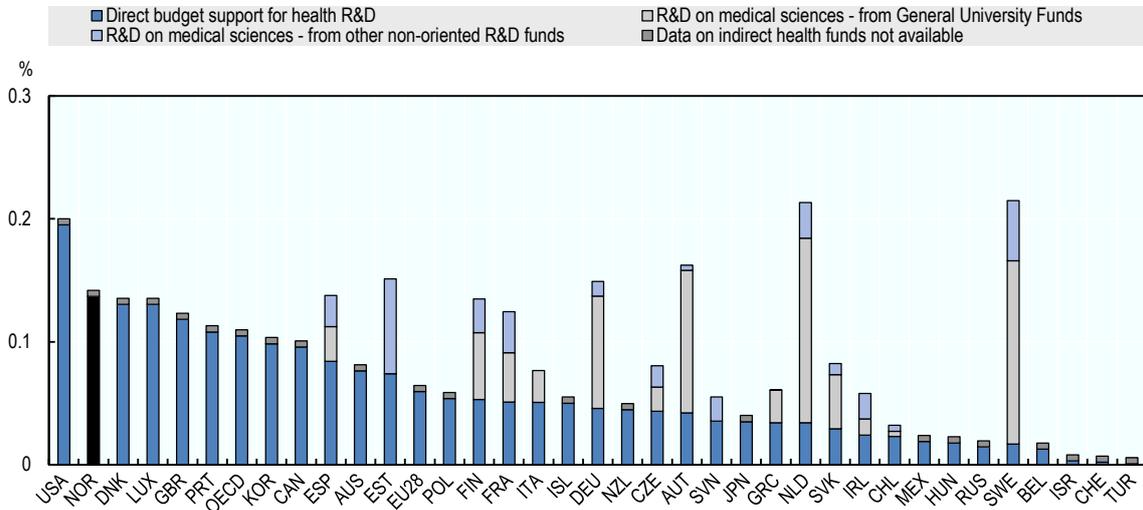


Source: Data provided by Research Council of Norway (RCN) based on Statistics Norway and Nordic Institute for Studies in Innovation (NIFU).

In international comparison, and taking into account the level of national income, Norway clearly stands out as one of the countries with the highest public effort on health R&D, second to the United States (Figure 3.2). However, as shown also in this figure, adding the share of the general funding of R&D (GUF, also called block or institutional funding) ultimately used for medical science can significantly change the relative position of countries. Although the breakdown of the GUF by objectives inside universities is not available for Norway in this set of data, other sources of information (NIFU) tend to show that Norwegian universities also dedicate on average a significant share of their block funding to health related research.

Figure 3.2 Government budget funding of health-related R&D, 2014

As a percentage of GDP

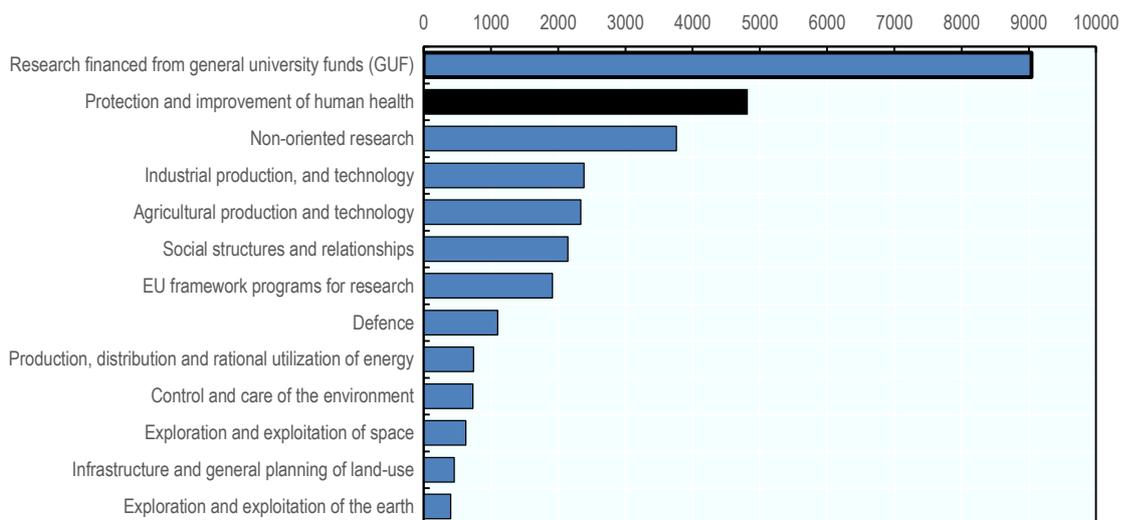


Source: OECD (2015b) http://dx.doi.org/10.1787/sti_scoreboard-2015-graph216-en

As shown in Figure 3.3, the GUF represent an important source of financing for Norwegian universities. Should this amount of funds for research be allocated to the respective objectives they serve, Norway would certainly remain among the leading countries in terms of government budget funding dedicated to health-related R&D with countries such as the Netherlands and Sweden.

Figure 3.3 Government budget appropriations or outlays for R&D (GBAORD) in Norway by socio-economic objective. 2015.

In Million NOK.



Source: OECD (2016), "Main Science and Technology Indicators (Edition 2016)", OECD Science, Technology and R&D Statistics (database). <http://dx.doi.org/10.1787/db23df7c-en>

In 2013, a little more than half of all the total funding for R&D to the higher education and research institute sector (including hospitals) was allocated by the Ministry of Health and Care Services while a little less than a quarter of funding came from the Ministry of Education and Research (not including the funding allocated through RCN). About 70% of R&D funding for medical and health sciences to universities came from General University Funds in 2015 (NIFU Database).

As regard the hospital trusts (i.e. the legal units for the individual hospitals), all the MHCS funding for R&D is allocated to them via the regional health authorities² in the form of block funding (59%) and earmarked funding for research (24%).³ 70% of these earmarked research funds available to the different regional health authorities are determined according to their respective performance on several input and output indicators (publications, new doctorates, external national and European competitive funding). These funds are then allocated competitively in each of the four regions by a joint committee gathering the regional health authority and the co-operating university among the hospital trusts within their region, with a majority of funding going to university hospitals (88% in 2015).

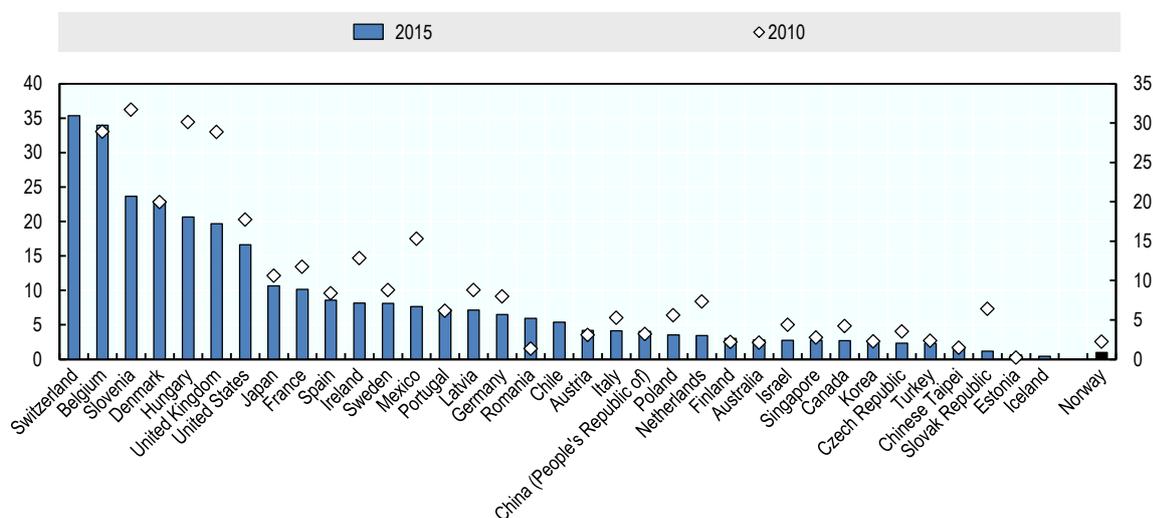
Overall, a small portion of public R&D funding for medical and health sciences is allocated in national or international competition. Moreover in 2013, only about 10% of funding for medical and health sciences was channeled through the RCN, the latter making it one of the areas with the second-lowest share of funding after humanities. Also, less than 2% came from abroad (MER 2016, p.56).

While public expenditure on R&D (BERD) in medicine and health is high, both with regard to other fields and in international comparison, business expenditure on R&D in pharmaceuticals and other biomedical technologies has traditionally been low, both as a share of GDP and a share of total BERD (OECD Health at a Glance 2015). The low R&D expenditure in the pharmaceutical industry is partially explained by the absence of large Norway-based pharmaceutical companies, in contrast to Sweden where AstraZeneca is an important ‘large player’ or Denmark, which has a critical mass of both large and medium-sized pharmaceutical companies. A recent analysis pointed out that health industry was the most research-intensive industry in Norway (Jacobsen et al 2016). However, this is largely explained by the large public research funding going to universities, hospitals (through the regional health authorities), and institutes. In contrast to the health area, business expenditures on R&D in other industries, such as oil and gas, maritime, agrofood and renewable energy account for a significantly larger share of total R&D. A recent mapping of Norway’s health industry found that it is a young but rapidly growing and dynamic sector with a total turnover of 52bn NOK in 2015 (Jacobsen et al 2017).

² The regional health authorities (“regionale helseforetak” or RHF) are the four administrative units owned by the MHCS for planning and organising the specialist health service. The public hospitals are owned by one of the four regional health authorities.

³ RHF are then free to decide how to allocate these funds among different research activities.

Figure 3.4 Percentage of BERD performed in the pharmaceutical industry



Source: OECD (2016), "Main Science and Technology Indicators (Edition 2016)", OECD Science, Technology and R&D Statistics (database), <http://dx.doi.org/10.1787/db23df7c-en>

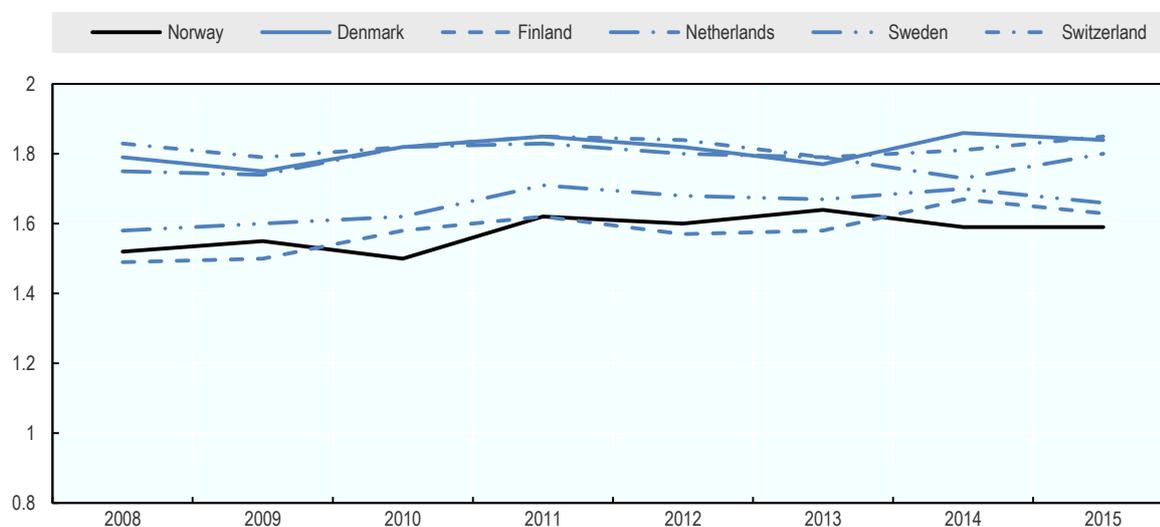
4. Health R&D outputs

4.1. Bibliometric performance in the health area

In terms of research output, an analysis by the Ministry of Education and Research in 2016 found that, when benchmarked with the other Nordic countries, Austria and the Netherlands, Norwegian publications in medical and health sciences tend to be among the least cited in several areas (MER 2016, p.57). A comparison in Norway with other fields also show mixed results in the health area. While the significant research funding allocated to areas regarded as relevant for social challenges⁴ over the past three decades has resulted in some clear successes in terms of scientific impact (measured through citation impact), the field of health (social science) for instance is the only one (with renewable energy but to a lesser extent) where Norway is lagging behind its comparator countries and shows no clear sign of improvement in terms of research excellence (see Figure 4.1).

⁴ Global and planetary change; Water science and technology; Renewable energy, sustainability and the environment.

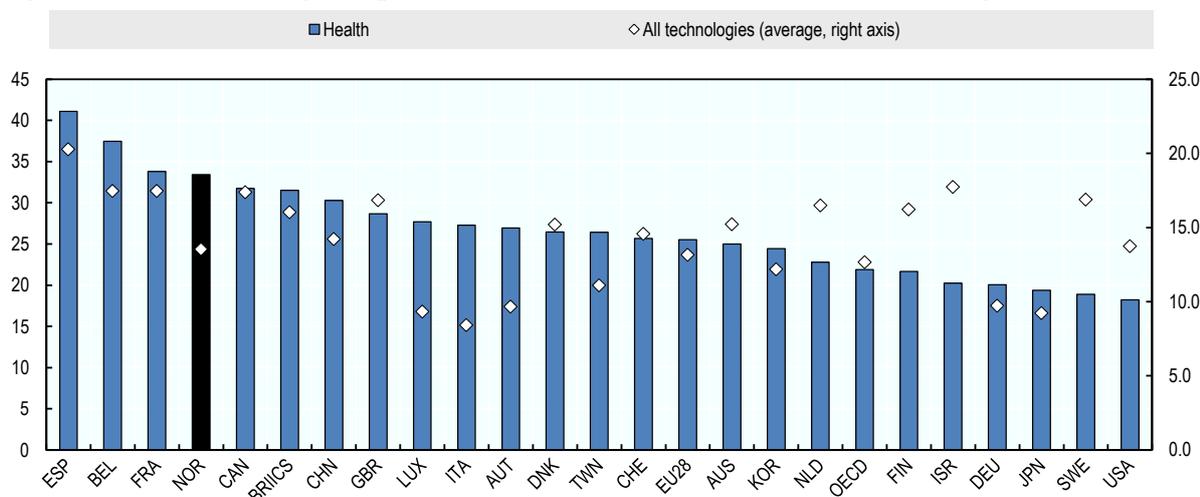
Figure 4.1 Field-Weighted Citation Impact (FWCI) publications in Health (social science), 2008-15, selected countries



Source: Author's calculations based on SciVal® database, Elsevier B.V. (accessed 24 October 2016).

4.2. Science-industry collaborations: from publications to patents... and vice versa

Looking at industry-academia collaboration, Norway has significantly lower shares of co-publications with industry in pharmaceutical research than the other countries compared with (MER 2016). Interestingly, while the links between science and innovation are strong in areas such as health and ICT-related technologies, Norway patents have an even higher propensity to cite non-patent literature (NPL, publications mainly) in international comparison (see Figure 4.2). This might indicate a proximity of Norwegian patent grantees with the scientific community, which is for instance the case of start-ups directly related to universities and research institutes. In countries with a strong industrial base in health related sectors, this propensity to cite NPL can be lower since the leading multinationals have their own research capacity where results are less often published. When looking at the share of total citations in patents (in a variety of patent offices) by country affiliations of scientific authors throughout the period 2007-13, the United States are far ahead of all other countries and Norway appears in 25th position, lagging behind countries such as the Netherlands, Sweden, Denmark or Poland (OECD, 2015b). In other words, Norway patents have a tendency to cite publications more frequently than most of its comparators, but research produced in Norway is still far from being one of the world reference science source in the health area.

Figure 4.2: Patents citing non-patent literature (NPL), Health and all technologies, 2007-13

Source: OECD (2015), STI Micro-data Lab: Intellectual Property Database, <http://dx.doi.org/10.1787/888933273957>

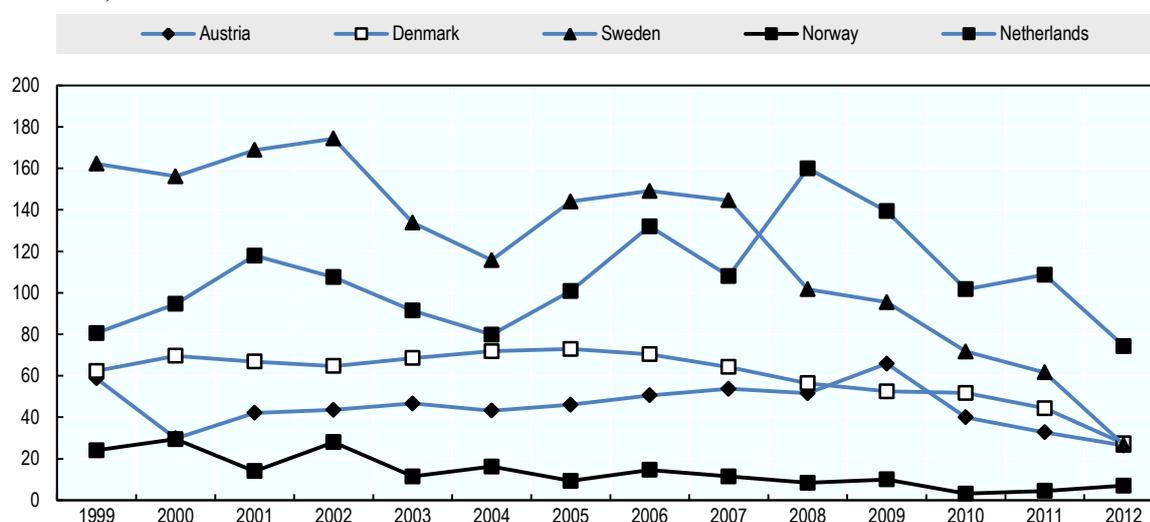
4.3. Innovation performance

Patents granted in the areas of medical technology and pharmaceuticals represent 9.7% of patents (out of a total of 67,722 patents) in Norway (14.3% in Sweden, out of a total of 300,025 patents) throughout the period 2001-2015, according to the PATSTAT database.⁵ The number of patents granted has in fact decreased significantly during this period, as shown by the EPO patents granted to Norwegian inventors between 1999 and 2012 in the area of medical technology.⁶ These data of course reflect the combined effect of the relative innovation performance of Norway and its industrial structure. They however tend to demonstrate that Norway produces more excellent science than innovation outputs in the health area.

⁵ WIPO Norway's country profile (http://www.wipo.int/ipstats/en/statistics/country_profile/profile.jsp?code=NO)

⁶ Patent granted in pharmaceuticals followed a similar downward trend (from 24 patents granted in 1999 to 7 in 2012).

Figure 4.3 Number of patent granted at the EPO for medical technology 1999-2012 by inventors' country of residence, for selected countries



Source: OECD (2015), STI Micro-data Lab: Intellectual Property Database, <http://dx.doi.org/10.1787/patent-data-en>

5. Structural reforms and policies in the health sector

5.1. Overall health policy reform

In recent years there have been a number of significant efforts to reform and strengthen health and healthcare in Norway (OECD, 2014). In 2002, the country undertook a major reform of the healthcare system. Five (later to become four) regional health authorities were established which were tasked with managing hospitals in their respective regions. The overarching goals of the reform were to improve the organization and provision of specialized healthcare and to improve its efficiency, quality and access throughout the country. An additional key element of the reform has also been the desire to strengthen patient or user involvement in the provision, operations and development of health care and health care services (Vårdanalys 2014).

Whereas the 2002 reform focused on hospitals and specialized care the objective of the so-called 'Coordination Reform' ('Samhandlingsreform') from 2012 was to improve interfaces and interactions between different levels of health care, particularly between municipalities and hospitals. Among the main limitations of this reform were the lack of consistent meaningful engagement between key stakeholders despite the fact that the reform was based on a strong consensus; another shortcoming was the lack of a structure to facilitate negotiation between stakeholders, to collect and use good information, in some cases to define the basic expectations of service delivery (OECD, 2014). These two limitations resonate with issues that can be found more specifically in the area of health R&D.

5.2. Health research, higher education and innovation policy reforms

In 2001, research was identified and put into legislation as one of the four main tasks of hospitals. The change was driven by a survey carried out that found that little research was being performed in hospitals and that it was not prioritized. Furthermore, in 2004, the government introduced earmarked funding for research in hospitals in a further attempt to raise research activity there. This earmarked allocation to research has increased between 2007 and 2015 (56 % in current prices), however to the lesser extent than the total R&D expenditures in the hospitals (84%) (Table 5.1).

Table 5.1 Comparison of the evolutions of GERD, HERD, R&D expenditures in hospital trusts and MHCS' earmarked allocation to the Regional Health Authorities for research, 2007-2015 (in million NOK)

	GERD	HERD (excl. university hospitals)	R&D expenditures in hospital trusts	MHCS' earmarked allocation to research
2007	36770,2	9797,1	2176,5	408,6
2008	40526,7	..	2469,8	426,2
2009	41884,5	11323,7	2433,5	445,0
2010	42759,1	..	2339,2	458,8
2011	45440,4	11988,9	2775,7	473,4
2012	48043,5	..	3126,7	488,1
2013	50748,2	13229,2	3470,4	504,2
2014	53866,9	..	3436,1	621,8
2015	60209,2	15522,7	4006,8	637,0

Sources: NIFU database; MHCS budgetary data.

Note: The allocations of MHCS to the RCN are not included

In the same period, R&D personnel (FTE) increased by almost 50%, resulting in a significant increase in R&D spending per capita (R&D personnel). External funding for R&D accounts for a rather small share of hospital trusts' total R&D funding. Funding from industry accounted for only around 1.5% of total hospital trusts' total R&D funding in 2015, while EU funding accounted for only 0.3%.

In 2013, the Ministry of Health and Care Services initiated a process for developing a 'Health&Care21 Strategy' for health and care research and innovation for the 21st century. Similar '21 Strategies' have been developed in other areas, such as oil and gas, climate, energy and marine research. The Ministry appointed 15 people to make up the Health&Care21 Strategy Committee, representing industry, universities and university colleges, hospitals, regional health authorities, user organisations, and government agencies. As part of the Health&Care21, the Ministry also established a large 'Strategic High-Level Forum on Health and Care Research and Innovation ('Topplederforum')'. This Forum was replaced by the Health&Care21 Advisory Board in 2015.⁷ The three overall aims of the Strategy were better public health, breakthrough research at a high international level and national economic and business development. The Strategy which was submitted by the Committee to the government in June 2014 identified five main priority areas –

⁷ <https://www.forskningsradet.no/prognett-helseomsorg21/Radet/1254005516067>

knowledge mobilization for the municipalities, health and care as an industrial policy priority, easier access to and increased utilization of health data, an evidence-based health and care system, a stronger emphasis on internationalization of research. The government published an ‘Action Plan for Implementation of the Health&Care21 Strategy’ in November 2015 in which it identified and committed itself to carrying out a number of initiatives to implement the Health&Care21 Strategy. Among other things, in response to the Strategy, the government reported that it had “*increased funding of basic research and the industry-oriented instruments for research and innovation*” as well as reorganising four health research programs at the RCN “targeting public health, treatment, development of services and innovation and global health” (MHCS 2017, p.3). A further response was the commissioning of a report – jointly by the Ministry of Education and Research and the Ministry of Health and Care Services – on the barriers to cooperation between universities and hospitals which was presented in December 2016 (MER and MHCS 2016). The report identified barriers in the following areas: ownership structure and cooperation arenas, floor area for research and education, research funding, administrative routines and regulations, research infrastructure, and education. Many of the barriers stem from the ownership structure – i.e. the fact that universities fall under the authority of the Ministry of Education while hospitals belong to the domain of the Ministry of Health and Care Services. In turn, this is partially explained by the fact that universities and hospitals have different missions. Both the ownership structure and the difference in missions and tasks raise regulatory as well as administrative barriers but also result in differences in funding streams and human resource systems.

In 2014, the Ministry of Health and Care Services created two working groups charged with making a proposal for a re-organization of the central administration for health and care services. One of the key changes was the creation of the Norwegian Directorate for eHealth in 2016 (‘Direktoratet for e-helse’). The primary task of the directorate is to promote the development of digital services in the health and care sector. The directorate shall also promote the creation of new and better services as well as industrial and commercial development (MHCS 2015b and 2017). The directorate had a budget of 380 m NOK for 2016 and 536 m NOK for 2017. Among other things, it is explicitly required to use public procurement to drive innovation. The directorate has a significantly larger budget and mandate than its Swedish counterpart, for example.

There have also been significant efforts to reform education in healthcare, both to increase the quality and to respond to changing needs for education. Among other things, the Ministry of Education and Research called upon the medical and health science faculties to develop guidelines for better practice-oriented education (UHR 2016). The ministry started in 2017 a process to develop national guidelines for all health and social care education. The new guidelines will come into force in 2020. The University of Tromsø – The Arctic University of Norway has created joint positions for staff other than doctors (e.g. nurses, physiotherapists) allowing these professions to work both in hospitals and universities. The merging of university colleges with universities has led to new university departments that offer both nursing and doctoral education (e.g. in Tromsø). The changes are based on the realization that people increasingly need to be trained to operate between the professions (e.g. between nurses and doctors).

In 2014, the government also presented a national program for welfare technology 2014-2020. (“*Nasjonalt program for utvikling og implementering av velferdsteknologi 2014-2020*”). One key goal is to strengthen the implementation of welfare technology in the municipalities. The Ministry of Health and Care Services has funded a pilot with 34

municipalities for safety and mastery of welfare technology led by the Norwegian Directorate for eHealth and the plan is now to roll out the initiative to all municipalities.

A ‘National health and hospital plan’ acknowledged the importance of innovation in providing new products but also new solutions for treatment, organization and logistics. It also pointed out that research-based knowledge and new ways of providing health care need to be implemented more quickly, stating that a systemic and holistic approach to innovation has been lacking in the health care sector (MHCS 2015a, pp.34 & 125).

6. Efforts to promote innovation

A number of both generic and thematic programs and initiatives provide public support for innovation in health and care in Norway. In 2015, 656 m NOK were channeled to health industry companies through Norway’s Skattefunn program, an R&D tax incentive (Innovation Norway 2016).

According to HelseOmsorg21 Monitor, RCN allocated 249 million NOK to innovation in health and care in 2015 (<https://www.helseomsorg21monitor.no/figur/209?chartType=bar-grouped>), though other sources estimate the amount to nearly 370 m NOK (Innovation Norway 2016). Most of the funding for supporting innovation in health and care, nearly half of total innovation funding, came through the program ‘Brukerstyrt innovasjonsarena’, ‘user-driven innovation arena’ or BIA which is a non-thematic bottom-up program. Other important RCN programs for funding innovation in 2015 – terms of funds allocated – were ‘BIOTEK2021’, a biotechnology program, RCN’s Center of Excellence program for research-driven innovation (SFI) and the ‘IKTPLUS’ a program aimed at promoting digitization and innovation. RCN has three programs dedicated to strengthening research and innovation in the sector, one for public health, one focused on care and health services and one on treatment and diagnostics. RCN also seeks to promote innovation in the public sector, through programs such as FORKOMMUNE, a program for supporting research and innovation in and for municipalities.

According to the ‘HelseOmsorg21 Monitor’, in 2015 Innovation Norway spent 153 million NOK on supporting innovation in healthcare. Health and welfare were one of six prioritized areas identified by Innovation Norway in a strategy and visionary document called ‘Drømmeløftet’ in 2015. Innovation Norway’s support comes primarily through general programs, for start-up grants, its programs for innovation contracts, which gives grants to SMEs to develop products and/or services together with commercial or public customers (IFU and OFU), and its cluster program, which funds three clusters in the medical and healthcare area (together with RCN and SIVA), namely Oslo Cancer Cluster, Oslo Medtech Cluster and Norwegian Smart Care Cluster.

Innomed is a national program and competence network for user-driven innovation in health and care services established and funded by the Ministry of Health and Care Services with support from Innovation Norway and run by SINTEF. It funds innovation projects and works with awareness-raising and inspirational initiatives and knowledge-sharing events. Between 2006 and 2015, Innomed had funded 102 ‘pre-projects’ which 48 had become

‘main projects’ (Innomed 2016). Innomed only provides funding to the ‘pre-projects’ – usually between 200 000 and 500 000 NOK per project.

The annual instruction letters which the Ministry of Health and Care Services gives to the four regional health authorities constitutes an important signaling mechanism in terms of what areas the Government wants the hospitals to work with. Looking through these documents (‘oppdragsdokument’) between 2008 and 2017, innovation has been emphasized to varying degrees. Strikingly, innovation was not mentioned until 2009. In 2009, the instruction to the South-Eastern Norway Regional Health Authority first mentioned innovation as important for ensuring better and more efficient healthcare and for economic value creation in industry. It also required the regional health authority to monitor that number of innovation contracts established and the funds allocated by Innovation Norway, the commercialization of research results, the number of user-driven innovation projects funded through the BIP program at RCN, the number of patents, registered inventions and licensing agreements and the number of companies started. Furthermore, it tasked the regional health authority with developing routines that would allow them better to identify the innovation potential of R&D projects.⁸ In 2012, the regional health authorities were charged with contributing to the development of a national database for innovation indicators for the hospital trusts. Innovation procurement was first mentioned in 2013. Since 2015, the instruction documents do not set clear goals or targets with regard to innovation, referring instead more generally for the regional health authorities to take into consideration the recommendations and priorities identified in the Health&Care21 Strategy and the ensuing Government’s Action Plan. In the instruction letter for the South-Eastern Norway Regional Health Authority for 2017, the only task relating to innovation is that the authority should strengthen innovation cooperation between specialized health care and industry in accordance with the government’s action plan for the implementation of Health&Care 21 Strategy. Three of the four regional health authorities have also produced regional innovation strategies for 2016-2020.⁹ However, it is too early to tell how much concrete impact these strategies are having on the operations of the regional health authorities. The four regional authorities have also produced a joint report on research and innovation.¹⁰ The report presents concrete research and innovation projects rather than a systemic analysis of opportunities and challenges or suggestions for actions or policies to promote innovation more systematically.

The directorates for health and e-health also jointly commissioned a report for a better innovation system in health and care which was presented in 2017 (Helsedirektoratet, 2017). Based on an analysis of the current state of the innovation system in health and care services, the report presented recommendations addressing a variety of topics ranging from knowledge sharing to skills development

⁸ <https://www.regjeringen.no/globalassets/upload/hod/bestillerdokument/oppdragsdokument-helse-sor-ost-b.pdf>

⁹ <https://helse-midt.no/Documents/Strategi/Strategi%20for%20innovasjon%20Helse%20Midt-Norge%20for%20perioden%202016-2020.pdf>; <https://helse-vest.no/seksjon/planar-og-rapportar/Documents/Regionale%20planar/2016%20-%20Regional%20innovasjonsstrategi%202016-2020.pdf>; <https://helse-nord.no/Documents/Forskning/Strategi%20for%20forskning%20og%20innovasjon%202016-2020.pdf>

¹⁰ <https://www.helse-sorost.no/Documents/Forskning/Nasjonal%20Forskningsrapport%202016.pdf>

7. Assessment and remaining challenges

Health research and innovation is a complex system with different key actors under the authorities of different ministries, with strict regulations (patient safety) and a weak tradition of interactions both among health care providers at the different levels of the health care system (primary care, specialized care) but also with actors outside the narrowly defined realm of healthcare (e.g. industry and other private actors, entrepreneurs, social sciences, etc.). The analysis reveals clear coordination problems between ministries regarding research, innovation, education and municipalities.

7.1. The promotion of innovation in healthcare is high on the policy agenda

Similar to other countries with mature and well-functioning public sector administrations, there is no dearth of analyses and initiatives to evaluate and reform systems and policies. In recent years, Norway has undertaken a number of important changes in the healthcare system. As a result, research funded and performed in hospitals has increased significantly. A government agency for e-health has been created with a mandate and resources to increase the accessibility and use of data, to streamline IT systems and to promote telemedicine and digitization in healthcare more generally.

The government has launched an ambitious strategy process for research and innovation in health and care resulting in the Health&Care21 Strategy and followed this up by presenting a 'Government Action Plan for Implementation of the Health&Care21 Strategy'. It has also initiated a process for identifying barriers to research cooperation between universities and hospitals, it has identified the need to strengthen research and innovation in and for municipalities' ability to provide better primary care, and the Ministry of Health and Care Services has commissioned a report to strengthen the health and care innovation system. Initiatives are underway to increase firms' access to clinical trial facilities and to promote the impact and 'translation' of research in hospitals into better healthcare and new products and solutions. The government has sought to promote innovation in healthcare by funding innovation projects and by promoting awareness-building and learning platforms. There is also an increasing policy focus on public procurement as a means of driving innovation and national business development in healthcare. Efforts are also being made to reform the education system to meet the changing needs and nature of healthcare provision. Finally, there are clear signs of a dynamic and burgeoning healthcare industry, in terms of startups and healthcare clusters.

The LTP's clear identification of healthcare and the public sector as prioritized areas but also the fact that it linked health, welfare and modernization have made an important and necessary contribution to advancing research and innovation in healthcare. The focus on municipalities also brought much-needed attention to the demands for knowledge and innovation resources and structures in this sector and to the fact that municipalities are important actors in this new landscape of health, knowledge and innovation.

7.2. From strategic plans to strategic actions

While the LTP is well articulated and marks significant progresses, it is long and not as precise as it might be. It intentionally contains only few concrete action points and does not

set “hard” priorities, apart from the few initiatives announced for the period 2014-18 (OECD, 2017).

The LTP in the health area, as in most other thematic areas it addresses, lacks concrete actions that would federate the different actors. The only precise action in this area was a new building for life sciences, pharmacology and chemistry at the University of Oslo as one of two prioritized construction projects. The LTP would need more clarity on targets and on the ambition level, some long-term ‘flagship’ action with commitments across budgets, which were absent in the healthcare area in the current LTP.

7.3. The co-ordination in the health area is not sufficient to reap the full benefits of many innovation projects

A number of challenges remain, related particularly to the needs of municipalities and a systemic approach to and governance of innovation in health and care. Firstly, innovation is still a recent ‘phenomenon’ as a policy and management issue in the public healthcare sector. While research constitutes one of four tasks hospitals are required to carry out by law, innovation is not. There are a significant number of innovation projects being carried out in hospitals, but hospitals and regional hospital authorities lack a structure for working systematically with the promotion, introduction and diffusion of innovation within their organizations. While there are a lot of pilot projects – both in hospitals and in primary care facilities – that are tested in one setting, there is no structure for diffusing, scaling or robustly testing solutions.

A clearer mandate and structure for innovation is particularly important in the healthcare sector that is characterized by strict regulations and procedural requirements which can result in a culture and atmosphere that is not conducive to experimentation and change. Thus, in addition to supporting innovation projects that have been generated bottom up, there is a need for leadership that enables and promotes innovation ‘from the top’. In a report informing the Health&Care21 Strategy, Grant et al. (2014) pointed to “*the management of organizational culture*” as essential in healthcare reform for ensuring “*enhanced quality and performance*” (p.viii), thus hinting that this might be an area that was not given enough attention in the Strategy. Similarly, the report on how to strengthen the innovation system in health and care provision underlined the importance of making innovation an integral part of management and operations. One indication that innovation is still not ‘top of mind’ in the public healthcare sector is that the expert groups set up to provide input to the ‘National Health and Hospital Plan’ presented in 2015 included users/patients, employers’ and employees’ representatives, researchers and doctors but no experts on organizational culture or innovation or change management.¹¹

While there are a number of competence centers focusing on primary care and on municipalities, there is no overarching structure or actor with a clear responsibility for developing the research and innovations that are needed in primary healthcare and for supporting municipalities in these efforts in a structured way. Furthermore, while there are efforts to strengthen cooperation, also on research and innovation, between hospitals and municipalities – thus, the Ministry of Health and Care Services provides around 10 m NOK of earmarked funding per year for cooperation between municipalities and specialized care – hospitals and the regional health authorities sometimes feel that they are competing with

¹¹ <https://www.regjeringen.no/no/aktuelt/Ekspertgrupper-skal-bidra-i-arbeidet-med-Nasjonal-helse--og-sjukehusplan/id758636/>)

the municipalities for public research and innovation funds which is not conducive to knowledge sharing or cooperation. Thus, rather than being complementary, there are unhealthy tensions between hospital-based medicine and research and research on and for municipalities and primary healthcare with the proponents of the former seeking to prevent reallocation of funding because it would be to their disadvantage. Also, whereas funding for research in hospitals has increased rapidly in recent years and could be argued to be quite generously endowed,¹² research in areas relevant for primary care and municipalities is generally regarded as being underfunded.

7.4. There is a need for more interdisciplinary and needs-driven research and innovation activities

The research financed by regional health authorities could benefit from more interdisciplinary approaches including social sciences and technological and engineering sciences, neither of which is naturally present in hospitals. Furthermore, even though the Ministry of Health and Care Services emphasizes the importance of the ‘usefulness’ of the research it funds through the hospital trusts, the research is not very needs-driven, rather it is almost entirely bottom-up driven by researchers’ interests. The emphasis on patient involvement in the design of research of research projects is laudable and important. However, it is not a guarantee that the research effort as a whole will be more oriented towards areas where there is greatest need or relevance; this would require patient or user involvement not at the project level but rather at the level of program design. Thus, paradoxically, research in hospitals can be described as ‘applied research’ since it takes place in a clinical setting and often involves patients but not necessarily needs- or challenge-driven from a societal perspective since its prioritization is left up to the individual researchers (although the Ministry of Health and Care Services has tried to identify some overarching priorities in its annual instructions letters to the regional hospital authorities in areas such as addiction, mental health, the elderly and women’s health). A further point of criticism is that the participation of hospital trusts in Horizon 2020 is extremely low. For this reason, the RCN has a special incentive to promote participation in Horizon 2020 in health, which is funded with 10 m NOK from the Ministry of Education and Research and one m NOK annually from the Ministry of Health and Care Services.

Many of the experts we interviewed pointed out that there is a lack of cooperation with industry in Norwegian healthcare. This is partially explained by the absence of large Norwegian pharmaceutical companies – in contrast to Sweden and Denmark – and partly because of the dominance of the public sector in the provision and financing of healthcare. The lack of tradition becomes evident in the difficulty for companies to get access to clinical trial facilities. For companies, the entry points to clinical trials at hospitals are the Technology Transfer Offices (TTOs) but the primary focus is on hospitals’ and universities’ internal needs.

7.5. The innovation governance trap

Innovation appears to fall between the cracks of ministries’ responsibilities and coordination. The Ministry of Trade, Industry and Fisheries is seen as responsible for innovation but does so primarily from a business and value creation perspective.

¹² One indication for this being acceptance rates for applications for research projects in hospitals reported as being between 25 and 35%.

Furthermore it has been reluctant to identify health as a prioritized industry, explained by a traditional aversion to ‘picking the winners’ or industrial policy. The Ministry of Health and Care Services focuses on the provision of quality and efficiency of care and has up until rather recently not seen innovation as an integral driver of this; The Ministry of Education and Research has focused on bottom-up funding and excellence of research; The Ministry of Modernization and Local Development has not assumed responsibility for strengthening municipalities’ research and innovation capacity and performance (with exception of certain aspects of digitalization). “Ministry of Trade, Industry and Fisheries has all the instruments for commercialization”

7.6. The attention deficit on education short cycles and lifelong learning

While there are a lot of Masters programs in health sciences, there is no mandatory system for continuous skills development and upgrading of health care professionals. Guidelines for continued training of health professionals do exist, raising awareness on the need to continuously update their skills but little has been done to implement the guidelines and monitor progress. While hospitals provide an environment for learning on the job and from peers, this is often not the case for health care professionals in municipalities. Universities focus excessively on programs (e.g. Masters programs) rather than shorter courses that might contribute to the needs for continuous skills upgrading and lifelong learning.

7.7. Potential policy options

As the main objective of this case study was to feed into the Innovation Policy Review of Norway 2017 (OECD, 2017), it is not intended to be a stand-alone report with specific recommendations. However, based on the analysis presented above, some potential policy options could be worth considering and discussing among the different stakeholders:

1. Devise a broad integrated research and innovation programmes that prioritise health challenges (see Box 1 and introduction of this document)
2. Consider developing a strategy or a system for research and innovation for municipalities and primary care. This could include the merger of existing regional competence centers for primary care and also assigning a mandate to an actor, organization or platform for structuring research, experimentation and upscaling of innovation in primary care.
3. Consider rebalancing research and innovation funding for specialized versus primary care
4. Build on the priorities identified in the LTP for health, welfare and modernization, by setting clearer targets on what is to be accomplished and how these areas should interact / integrate. Include long-term action with commitments across budgets.
5. Create larger innovation platforms, partnerships or structures with responsibilities at the national level; this is currently too fragmented and decentralized, right now too much money is allocated to small, scattered, projects; some steering and structure is needed here;
6. Focus more on the triangle research-innovation-education and on a more holistic view in the revision of the LTP
7. Strengthen coordination across ministries; Grant et al (2014) suggest to “*consider establishing a central coordinating function to help integrate health research agendas across ministries and other stakeholders*” (p.vii)
8. Consider establishing an oversight function to assess the outputs, quality and impact of the research financed through the regional health authorities.

9. Open up research funding from regional health authorities to researchers outside the hospital trusts (eg in universities or institutes) and promote more interdisciplinary research;
10. Increase the share of funds that is allocated in national and perhaps international competition (i.e consider opening up funding to international applicants as long as it can be argued that there will be benefits for health and care in Norway) and according to strategic needs-based and more systemic (and transformative) priorities and objectives
11. Increase firms' access to testbeds and clinical trials

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