Evaluating the Design of a Digital Communication Platform for Recipients of Home-Care Services to Improve Municipal Care Services: A Proof of Concept Study

Linn Nathalie Støme[1]*, Arne Norrud[2], Martin Fjordholm[3] and Kari J Kværner[4]

[1]*Oslo University Hospital, Centre for Connected Care, Oslo, Norway*
[2]*Uniconsult AS, Dronning Mauds Gate 3, Oslo, Norway*
[3]*The Norwegian Association of Local and Regional Authorities, Oslo, Norway*
[4]*Professor, Oslo University Hospital, Centre for Connected Care, Oslo, Norway*

*Corresponding Author: Linn Nathalie Støme, Oslo University Hospital, Centre for Connected Care, Oslo, Norway.

Abstract

Background: The purpose of the project "DigiHelse" is to strengthen the municipality's care services in Norway by offering a digital communication platform to recipients of home-based health services and their dependents. The aim of the present study was to assess how DigiHelse should be designed and developed to ensure increased quality and value for recipients, the home care service and the society.

Methods: Early health assessment with stakeholder insights and scenario drafting was applied to identify health quality gains and address patient safety issues, define relevant outcome measures and compare the new solution to the current situation. Outcome measures were quantified priced and analysed using a 10-year present value calculation with a calculation rate of 4%. A risk analysis was also carried out.

Results: The following outcome measures for recipients, the home care service and the society were identified and assessed to show the potential socioeconomic value of DigiHelse; Increased predictability for recipients, Increased involvement from relatives and volunteers, Increased predictability for the home care service, Greater efficiency with dialogue with citizens and Better time management, Reduce phone inquiries, Provide technical basis for developing digital services. The potential socioeconomic value of selected outcome measures was calculated based on expert opinion and national statistics. In addition to addressing quality and safety outcomes, the present value calculation estimated savings equal to 172.6 million euro, with present value investments costs of 5.5 million euro over 10 years. This resulted in net present value per invested Euro in the public sector equal to 3.2. Overall risk assessment related to the intervention's socioeconomic profitability was deemed average.

Conclusion: This study shows how early health assessment may be applied in the conceptual phase to address quality outcomes that can be used for benchmarking purposes in the further development and implementation. We suggest that early assessment by means of stakeholder analysis and quantification of potential gains has a value from a concept stage of an improvement initiative in health care.

Keywords: *Early Assessment; Health Innovation; Organizational Innovation; Digitalization; Health Technology Assessment*

Evaluating the Design of a Digital Communication Platform for Recipients of Home-Care Services to Improve Municipal Care Services: A Proof of Concept Study

02

Abbreviations

HTA: Health Technology Assessment; Early HTA: Early Health Technology Assessment; C3: Centre for Connected Care; IPLOS: Legal Health Register for Municipal Health and Care Services; EMR: Electronic Medical Records; Mill. Euro. pr. year: Million Euro Per Year

Background

The Norwegian health and welfare sector is undergoing large-scale digitalisation programs to transform the delivery of health services and improve quality of care provision [1]. In addition, home care services provided by the municipalities is facing an increased demand [2]. The number recipients in the home care service below retirement age have tripled over the ten last years. Also, due to shorter hospital stays with more day care and outpatient treatment, more demanding user groups with complex medical and psychosocial needs are moved to the municipalities.

A strengthened home service may prevent hospital readmissions and reduce perceived severity among the chronically ill. National guidelines emphasise the need for increased focus on home care services and early efforts, which is identified in several reports and white papers within recent years, such as "Norwegian Ministry of Health and Care Services. Report no. 26 (2014-2015) The primary health and care services of tomorrow - localized and integrated [3], "Report no. 29 (2012-2013) Future Care [1] and Care Plan 2020 The Norwegian Government's plan for the care services field for 2015-2020 [4]. Ultimately, this may optimise the cooperation between municipality care services, voluntary and family-based care and specialist health services [4].

Addressing quality of care, patients safety and economic aspects is of importance when promoting new services [2]. The funding scheme for municipality care services in Norway is partially based on local investments though the country's 426 municipalities. Hence, to strengthen the home care service nationally, benefits in terms of potential socioeconomics are a prerequisite to acquire funding for development and implementation. To ensure municipal resource allocation for digitalisation projects, there is a need to select interventions that produce the greatest benefits and document why they should be prioritized for funding [5].

Defying this logic, large-scale digitalisation projects in the health and welfare sector are not always accompanied by rigorously designed research projects to assess effects, in terms of implications on cross-sector coordination, inclusion, coherence and empowerment [6].

"DigiHelse" is a nationwide digitalisation project initiated by the Norwegian Directorate of E- health. Its main purpose is to enable a digital dialogue between the Norwegian home care service and the recipients, introducing the following three platform features: digital messages between resident and the service, visualize agreed and completed visits with associated information, and the option to cancel visits and final notifications of completed visits.

Aim of the Study

The aim of the present study was to assess how DigiHelse may be designed and developed to ensure increased quality and value for recipients, the home care service and the society.

Methods

Study perspective

DigiHelse is designed to become a public and national service for the home service, gradually implemented and offered to residents in Norwegian municipalities. Early health technology assessment (Early HTA) with stakeholder insights and scenario drafting was applied to identify quality gains and address patient safety issues, define relevant outcome measures and compare the new solution to the current situation. Outcome measures were quantified priced and analysed using a 10-year present value calculation with a calculation rate of 4%. A risk analysis was also carried out.

Evaluating the Design of a Digital Communication Platform for Recipients of Home-Care Services to Improve Municipal Care Services: A Proof of Concept Study

03

Population

Recipients of home based services and their relatives were the main target group of the intervention. The present study assessed the consequences of implementing the new service for recipients, health providers and the society.

Setting and location

The study was set in Oslo in February 2017. Primary health care in Norway is provided under the responsibility of Norway's 426 municipalities. This includes General practitioners, primary care nurses, care institutions and home care. Nurses and doctors in preventive and long-term care services are usually employed in municipal health care [7]. Municipalities spend almost one quarter of their total expenditures on health care and still the home care sector in Norway is under constant pressure due to lack of recourses and capacity [8].

The intervention

The purpose of DigiHelse is to strengthen the municipalities' care services by providing digital services to recipients of home services and their relatives. The project is based on the existing "Helsenorge.no" platform from the Norwegian Directorate of e-Health which provides digital health services nationally. The initiative is considered an important step towards achieving a patient centered health care service in Norway, as the main target group for the intervention is both recipients of home-based services and their dependents.

Choice of health outcomes

To determine and quantify potential effects of the project, the project steering group identified stakeholders from different parts and professions in the home care service. They were to represent a holistic view of potential effects in terms of improved quality, efficiency and safety. The following areas of expertise were included in the project group: professional system managers from Oslo, leading professionals in home based services from Oslo and Bergen, health economists from the municipality board and Centre for Connected Care (C3) at the University Hospital in Oslo, resources from the e-Health Directorate, and project manager from Oslo municipality. The stakeholders represented an expert opinion from each field of the service, including recipients. Stakeholder insight was collected through four main workshops assessing the consequence of implementing the following three digital features for the home care service and its recipients: digital messages between resident and the service, visualize agreed and completed visits with associated information, and the option to cancel visits and final notifications of completed visits.

Measurement of effectiveness

Addressing quality of care and patient safety aspects, the stakeholders identified nine main health value categories; predictability and coping, accessibility and cooperation with the service, privacy and information security, easier task management, better cooperation with residents, basis for further digitisation of citizens' services, increased prevention, better use of community resources and E-health and digitisation. Priced quantitative, unpriced quantitative and qualitative effects identified by the stakeholders were characterised in three main groups; residents, health care service and society. Grouped in three, the effects for residents, health care service and society are listed in figure 1. Further, the stakeholders identified six effects that could be quantified and priced to be included in the analysis of potential socioeconomic value. The following effect measures are marked with a triangle in figure 1; Increased predictability for recipients, Increased involvement from relatives and volunteers, Increased predictability for the home care service, Greater efficiency with dialogue with citizens and Better time management, Reduce phone inquiries, Provide technical basis for developing digital services.
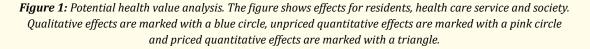
Data sources and estimation of resources used

The legal health register for municipal health and care services (IPLOS) is the central health register which forms the basis for national statistics for the home care service. In this analysis IPLOS provides the number of recipients enlisted in home care service, the need for assistance and the average number of hours the service devotes to home care, practical assistance and both. Based on this register data and

---

Evaluating the Design of a Digital Communication Platform for Recipients of Home-Care Services to Improve Municipal Care Services: A Proof of Concept Study

04

Figure 1: Potential health value analysis. The figure shows effects for residents, health care service and society. Qualitative effects are marked with a blue circle, unpriced quantitative effects are marked with a pink circle and priced quantitative effects are marked with a triangle.

information about the average length of each visit from tender documents in Oslo municipality, the average number of visits per week was estimated on a national basis. Interviews with professionals from the service were used to map the administrative workload that could be limited by digitalisation of the service. Data from a survey in Oslo municipality (special extract from the electronic medical record (EMR) system in Oslo municipality) and findings from the municipality's price model for home services were used to estimate the amount of unnecessary journeys for the home service.

Finally, the project also registered phone calls to the home service in Oslo municipality to study the percentage of the inquiries that could potentially be replaced by the digital communication.

Evaluating the Design of a Digital Communication Platform for Recipients of Home-Care Services to Improve Municipal Care Services: A Proof of Concept Study

05

Analysis

A 10-year present value calculation with a calculation rate of 4% was used for the estimates. The value of the six priced effect measures was calculated based on scenarios elaborated by the stakeholders and data collected from the sources mentioned above. The benefits were also weighed against costs; initial investments in infrastructure, maintenance costs, sequential implementation rate and costs associated with training.

Risk assessment

There are many risks associated with this assessment due to the early stage of evaluation and lack of data. The estimates of the analysis are built on assumptions and different perspectives of experts in the field. The stakeholders evaluated the risk associated to the potential effects of the digital service on a three point scale; low, medium and high.

Results

Stakeholder insight and scenario drafting

The six scenarios elaborated by the stakeholders to quantify quality and safety outcome measures with the new solution compared with the current situation, are presented below.

Increased predictability for recipients: With the current solution, recipients are not given the exact time of their appointment and dedicate a lot of time waiting for the service. In the digital platform, arrivals and delays will be displayed and the recipient is given the opportunity to cancel visits. The hypothesis was that predictability gives higher quality of life and that it is possible to estimate the value of the time recipients can use on other tasks than waiting.

Increased involvement from relatives and volunteers: An ambition for the home services is that to ensure good and effective services, relatives and volunteers must be included [4]. In this interaction there are both quality gains, but also opportunities to restructure and modernise how the home service works, as some care tasks may be transferred to relatives.

Increased predictability for the home care service: The proposed intervention may increase predictability for the home service, as it will be easier to report changes to planned visits for both the recipients and the relatives through the digital dialogue. Enhanced predictability may improve both quality and safety as the recipient receives necessary treatment, and the service avoids consuming precious time searching for a recipient that does not answer the door for a scheduled visit.

Greater efficiency with dialogue with citizens and Better time management: The home service daily receives inquiries that interrupt work flow. The hypothesis was that digital communication provides a better overview over the work load and allows for more efficient planning of daily work chores for the home service.

Reduce phone inquiries: The home service currently receives several phone calls related to both planned and completed visits, as well as recipients and relatives wishing to move or cancel visits. The digital platform provides recipients with an overview over planned and completed visits, and the possibility to cancel visits.

Provide technical basis for developing digital services: A large proportion of the municipalities will have to undertake procurement of a digital infrastructure for home services if the present project is not implemented.

Potential socioeconomic value of outcome measures

The potential socioeconomic value of the selected outcome measures was calculated based on expert opinion and national statistics. The estimates for each outcome measure are presented below. A related risk assessment of the estimates is presented in table 2.

Evaluating the Design of a Digital Communication Platform for Recipients of Home-Care Services to Improve Municipal Care Services: A Proof of Concept Study

06

Increased predictability for recipients: Increased predictability gives in this scenario a possible annual value of 408.4 million Euro per year (Mill. Euro per year). If the recipients knew the exact arrival of the home service, the assumption was that an hour per visit may be saved. This was applied for 50% of recipients which receives 1-6 visits a week (89 900). The home care service informed the stakeholders that employed recipients receive their visits on time; hence this group was excluded from the cohort. The unemployment rate from the Norwegian Labour and Welfare Administration of 30 Euro an hour was used to calculate the value of the recipients' free time. This effect was not included in the present value calculation as the value of free time is debatable.

Increased involvement from relatives and volunteers: In improved communication between relatives and the service this scenario may amount to savings of 13.8 million Euro a year. For relatively self-sufficient recipients, relatives and volunteers may carry out one visit per month on average. There are 76 000 recipients who have an average of 3 visits per week and are considered in need of limited aid. A visit lasts on average for 20 minutes.

Increased predictability for the home care service: With the ability of the user to digitally cancel and postpone visits, a reduction of 30% unnecessary journeys was estimated; savings are estimated to be 3.8 million Euro a year. The estimated saving is based on 46 000 less unnecessary journeys a year, with the hourly rate of 48 euro and a duration of 30 minutes on average.

Greater efficiency with dialogue with citizens and Better time management: Through interviews with professionals from the home services the stakeholders estimated potential time savings of 30 minutes per day with digital communication resulting in savings of 7.1 million Euro a year. As this type of communication is mainly directed to the coordinators, 1350 coordinators will be affected nationwide.

Reduce phone inquiries: The estimated impact of reduced phone inquiries may amount to 1 million Euro per year on a national basis. To assess whether the intervention can reduce phone inquiries, that otherwise could be solved digitally, the project group conducted a phone survey in Oslo and in Bergen. The employees registered phone requests in the following categories: 1) Is the visit completed? 2) What time is the visit? 3) Change or cancelled visit. 4) Other. The stakeholder group believed that the digital platform may reduce the number of phone inquiries within categories 1 - 3. After the survey a scenario where digital communication can reduce the phone inquiries to the home service with 40% was built.

Provide technical basis for developing digital services: Providing a technological basis for developing digital services may results in a one-time saving of 18.25 million Euro. If 50% of the municipalities in Norway each procure their own platform they will on average consume 100 000 Euro each, including procurement, infrastructure, licenses/rent etc. This effect was not included in the present value calculation because digitalisation of home services is still not statutory.

Assessment of risk

An assessment of the risk related to the interventions feasibility and potential socioeconomic value was carried out by the stakeholders and evaluated on a three point scale (low, medium, high) (Table 1). Average risk of the feasibility of the intervention was deemed medium.

Summary of priced effects

Four of six priced effects were included in the present value calculation, which amount to potential savings in resources of 25.8 million euro a year. Table 2 shows the summary of the priced effects in million Euro a year if the digital platform for home services was to be implemented.

Overall socioeconomic value

Table 3 shows the overall socioeconomic value estimated with a net present value calculation over ten years. The net present value of the digital platform taking into account a gradual rate of implementation was estimated to 172.6 million euro over ten years. The overall

Evaluating the Design of a Digital Communication Platform for Recipients of Home-Care Services to Improve Municipal Care Services: A Proof of Concept Study

07

Effect	Explanation for the assessment of risk	Assessment of risk
All effects	The value is estimated on a national basis, but it is uncertain whether all municipalities will use the service. However, national and municipal guidelines on digitisation requirements help reduce this risk.	Medium
Effects for the home service	It is demanding to take new work tools and processes into use. The uncertainty may be reduced with robust anchoring in the leadership. Such anchoring is included in the implementation strategy of the project but is challenging given the number of municipalities and districts.	Medium
All effects	The need for local resources may be underestimated. Home services and municipalities must provide resources that can actively contribute to the anchoring of the project and enhance quality before implementation.	Medium
Most effects	Most effects are results of small time-savings in multiple processes. The benefits may be hard to realize in i.e. reduction of staff. It is more likely that these benefits will result in better quality, serving an increase in volume without increase in staff etc.	Medium
Time saving due to fewer phone calls	It may take more time to answer a written inquiry than a phone call and it is uncertain how much dialogue increases when it becomes easier for the recipient to contact the home service via a digital channel 24 hours a day.	Low
Effects for the user	Uncertainly on how large a proportion of recipients have a degree of disability to the extent they are unable to use digital services.	Medium
Effects for the user	If the population does not know about the new service and does not make use of it. When introducing the service, this should be taken into account.	Medium

Table 1: *Summary of risk assessment. The table shows risk elements identified for the effects included in the present value calculation and an explanation of the rating on the three point scale; low, medium and high.*

Priced effect measures	Euro	Included in the present value calculation	Not included in the present value calculation
For residents			
Increased predictability for recipients	Mill. Euro. pr. year		408,4
Increased involvement from relatives and volunteers	Mill. Euro. pr. year	13.8	
For the service			
Increased predictability for the home care service	Mill. Euro. pr. year	3.8	
More effective of dialogue with citizens and Better time management	Mill. Euro. pr. year	7.1	
Reduce phone inquiries	Mill. Euro. pr. year	1	
Provide technical basis for the development of digital services	Mill. Euro. pr. year	19.1	
Total	Mill. Euro. pr. year	25.8	

Table 2: *Summary of priced effects. Estimated resources saved for each of the six priced effect measures. The third column shows the effects included in the present value calculation and the fourth column shows the effects excluded from the present value calculation.*

Evaluating the Design of a Digital Communication Platform for Recipients of Home-Care Services to Improve Municipal Care Services: A Proof of Concept Study

08

costs associated with the implementation of the digital platform were 96 million euro over 10 years. The table also shows the assessment of the unpriced quantitative and qualitative effects, rated on a scale from plus to four plus, for impact and range. Present value investment costs for the public sector and net present value per invested euro is also presented in the table. Finally the overall assessment of the risk related to the interventions socioeconomic value is evidenced in table 3.

Net present value of the intervention (in Euro million)	172.6
Assessment of unpriced quantitative effects	+++
Assessment of qualitative effects	+++
Present value investment cost in the public sector (in Euro million)	5.5
Net present value per invested euro in the public sector (in Euro)	3.2
Overall assessment the risk related to the intervention's socioeconomic value	Medium

Table 3: *Summary of potential socioeconomic value. The table shows an overall summary of the evaluations performed on the project. Assessment of unpriced quantitative effects and assessment of qualitative effects are both evaluated on a three point scale where ++++ is the highest score.*

Discussion

This study applied stakeholder insights and scenario drafting to identify health quality gains, socioeconomic benefits and define relevant outcome measures for follow-up. We found that the implementation of DigiHelse may have positive implications on quality, safety and efficiency and provided relevant project outcome measures. A 10-year present value calculation with a calculation rate of 4% estimated the significance of six identified outcomes measures and the overall project risk was deemed medium on a three point scale. Based on findings from this analysis DigiHelse was granted additional funding to further develop the intervention.

The design and development of digital interventions presents evaluative challenges, such as problems obtaining valid outcome measures, due to the rapidly changing technological landscape [9]. As such, current methods need to be adapted to take into account the way digital health interventions are delivered, and evaluation must be built into the development cycle from the initial concept. Such evaluations may, however, be demanding as a concept stage of innovation usually lack empirical data on effect [10]. Health Technology Assessment (HTA) is a well-established method for assessment for health interventions in later phases of implementation. HTA is defined as an interdisciplinary process for synthesizing information regarding medical, social, economic and ethical issues related to the introduction of a new health technology [11]. Currently, additions to the literature on adapting these methods to earlier stages of product and service development is emerging [12]. Early health technology assessment can be defined as the early examination of the medical, economic, social, and ethical implications of a health intervention to determine the potential of its incremental value in health care [13].

In the present study, stakeholder insight and scenario drafting were used to assess potential benefit of health innovation [14-18]. Previous studies concerning early assessment of health innovation have successfully applied such approaches to align stakeholders and show potential value at an early stage. Evident in the literature are frameworks for technology still in development, methods for applying stakeholder views in prioritisation of outcome measures and the use of qualitative scenarios based on expert opinion for data collection in cost-effectiveness modelling [17,19,20].

DigiHelse may represent a significant boost for the development of digital services within the municipal health and care sector, with the potential reach to all citizens in Norway. Although the project was in a concept stage at the time of analysis, assessment of potential value in terms of quality, safety and efficiency, may provide information to reduce uncertainties surrounding decisions on further develop-

Evaluating the Design of a Digital Communication Platform for Recipients of Home-Care Services to Improve Municipal Care Services: A Proof of Concept Study

09

ment [21,22]. Information on costs and benefits may provide key decision support in ensuring that the final solution meets the need of the population and solves the actually problem [23]. Economic evaluations are necessary in informing rational decisions about investments in quality improvement as they apprise whether the differential investment is justiciable in face of the differential benefit it produces [24]. As a consequence of the documented health and socioeconomic value the present health assessment provided, DigiHelse received funding for further development and implementation. In the next phase, the project will be piloted in four districts in Oslo, starting in March 2018. At that time, the outcome measures will be reassessed and evaluated, by the stakeholders. The long-term value of the investment in technology is however not included in the present study; the effect of establishing a digital platform was not included in the net value calculation. However, all effect measures support key objectives referred to as main goals of the municipal care and care services [1,3,4,25]. Stakeholder insight and scenario drafting were applied to supplement the poor availability of data. As such, the estimated socioeconomic value of the project is based on many assumptions. All of the model inputs are subject to sources of uncertainty, including errors of measurement, absence of information. To show the risk related to the realization of project and the estimated effects, a risk assessment was carried out for decision support.

Conclusion

This study shows how early health assessment may be applied in the conceptual phase to address quality outcomes that can be used for benchmarking purposes in the further development and implementation. Recipients of home based services and their relatives were the main target group of the intervention. The present early assessment identified potential benefits both for the patients, the home care service as well as socioeconomic benefits. We suggest that early assessment by means of stakeholder analysis and quantification of potential health gains is of value as early as in the concept stage of an improvement project. A re-assessment of identified outcome measures may provide useful to ensure that the final solution has the ability to provide the intended improvement. It also may ensure that the project development of proceeds according to plan.

Authors' Contributions

LNS, MF and AN conceived, designed, and performed the experiments. LNS, MF, and AN analyzed the data. LNS and KJK authored the manuscript. MF and AN critically reviewed the manuscript.

Disclosure

No competing interests are declared.

Patient Consent

Not applicable.

Ethics Approval

The Regional Committee for Medical Research Ethics, Region Eastern Norway provided information that consent was unnecessary.

Consent for Publication

Not applicable.

Availability of Data and Materials

The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

Funding

Evaluating the Design of a Digital Communication Platform for Recipients of Home-Care Services to Improve Municipal Care Services: A Proof of Concept Study

10

Data Sharing Statement

All available data can be obtained by contacting the corresponding author.

Contribution Statement

All Authors meet with the ICMJE criteria for authorship.

Bibliography

1. Report no. 29 (2012-2013) Future Care, Norwegian Ministry of Health and Care Services (2013).

2. Report no. 26 (2014-2015) The primary health and care services of tomorrow - localised and integrated, Norwegian Ministry of Health and Care Services (2014).

3. Report no. 26 (2014-2015) The primary health and care services of tomorrow - localised and integrated, Norwegian Ministry of Health and Care Services (2015).

4. Care Plan 2020 The Norwegian Government's plan for the care services field for 2015-2020, Norwegian Ministry of Health and Care Services (2015).

5. Etchells E., *et al*. "Comparative economic analyses of patient safety improvement strategies in acute care: a systematic review". *British Medical Journal Quality and Safety* 21.6 (2012): 448.

6. Ministry of Government Administration, Digitizing public sector services Norwegian eGovernment Program. In: Affairs RaC, editor. Regeringen.no: Ministry of Government Administration (2012).

7. Ringard A., *et al*. "Norway: health system review". *Health Systems in Transition* 15.8 (2013): 1-162.

8. B R Rasmussen. "Between Endless Needs and Limited Resources: The Gendered Construction of a Greedy Organization". *Gender, Work and Organization* 11.5 (2004): 506-525.

9. Michie S., *et al*. "Developing and Evaluating Digital Interventions to Promote Behavior Change in Health and Health Care: Recommendations Resulting from an International Workshop". *Journal of Medical Internet Research* 19.6 (2017): e232.

10. Esposito D., *et al*. "Using qualitative and quantitative methods to evaluate small- scale disease management pilot programs". *Population Health Management* 12.1 (2009): 3-15.

11. Kristensen FB., *et al*. "Practical tools and methods for health technology assessment in Europe: structures, methodologies, and tools developed by the European Network for Health Technology Assessment, EUnetHTA". *International Journal of Technology Assessment in Health Care* 25.2 (2009): 1-8.

12. Poulin P., *et al*. "Introduction of new technologies and decision making processes: a framework to adapt a Local Health Technology Decision Support Program for other local settings". *Medical Devices (Auckland, NZ)* 6 (2013): 185-193.

13. Støme LN., *et al*. "Early assessment of innovation in a healthcare setting". *International Journal of Technology Assessment in Health Care* (2019): 1-10.

Evaluating the Design of a Digital Communication Platform for Recipients of Home-Care Services to Improve Municipal Care Services: A Proof of Concept Study

11

14. Abrishami P., *et al*. "How can we assess the value of complex medical innovations in practice?". *Expert Review of Pharmacoeconomics and Outcomes Research* 15.3 (2015): 369-371.

15. Bridges JF. "Lean systems approaches to health technology assessment: a patient-focused alternative to cost-effectiveness analysis". *Pharmaco Economics* 24.2 (2006): 101-109.

16. Bartelmes M., *et al*. "Methods for assessment of innovative medical technologies during early stages of development". *GMS Health Technology Assessment* 5 (2009): 15.

17. Harris-Roxas BF and Harris PJ. "Learning by doing: the value of case studies of health impact assessment". *New South Wales Public Health Bulletin* 18.9-10 (2007): 161-163.

18. Sayres LC., *et al*. "Integrating stakeholder perspectives into the translation of cell- free fetal DNA testing for aneuploidy". *Genome Medicine* 4.6 (2012): 49.

19. Retel VP., *et al*. "Scenario drafting to anticipate future developments in technology assessment". *BMC Research Notes* 5 (2012): 442.

20. Gantner-Bar M., *et al*. "Prospective Assessment of an innovative test for prostate cancer screening using the VITA process model framework". *Studies in Health Technology and Informatics* 205 (2014): 236-240.

21. Ijzerman MJ and Steuten LM. "Early assessment of medical technologies to inform product development and market access: a review of methods and applications". *Applied Health Economics and Health Policy* 9.5 (2011): 331-347.

22. Markiewicz K., *et al*. "Medical devices early assessment methods: systematic literature review". *International Journal of Technology Assessment in Health Care* 30.2 (2014): 137-146.

23. Strønen FHH., *et al*. "Dynamic Capabilities and Innovation Capabilities: The Case of the Innovation Clinic". *Journal of Entrepreneurship, Management, and Innovation* 13.1 (2017): 89-116.

24. Portela MC., *et al*. "How to study improvement interventions: a brief overview of possible study types". *British Medical Journal Quality Safety* 24.5 (2015): 325.

25. Norwegian Ministry of Health and Care Services, Report no. 34 (2015-2016) Principles for priority setting in health care - Summary of a white paper on priority setting in the Norwegian health care sector Oslo (2016).