



Direktoratet for
e-helse

Market dialogue

Planning project for a national electronic health record for primary care services and a national health sector information exchange

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OBJECTIVE OF THE DIALOGUE PROCESS

The Ministry of Health and Care Services have provisioned the Directorate of eHealth to conduct a planning project for establishing a national electronic health record (EHR) for primary care services and a national health sector information exchange.

The Directorate of eHealth would like to engage the supplier market and industry associations for health IT solutions and services to provide input to the planning project in areas such as solution scope and architecture, procurement strategy, implementation strategy, governance and organization models, cost estimation, and benefit realization. The project planning report is to be finished by January 2020 and will be an important basis for the government's and municipalities' investment decision process, tentatively in 2020.

Further information about the project and the solution concept can be found in Appendix 1.

This dialogue is part of a planning project and does not constitute a procurement.

REQUEST FOR INFORMATION

We are interested in input on a broad range of subjects, and main areas of interest within each subject are presented in the following.

1. Functionality in the electronic health record
2. Functionality in a citizen portal
3. Collaboration and interoperability
4. Identity and access management, information security and privacy
5. Innovation and eco-system support
6. Clinical decision support and knowledge management
7. Contract and sourcing strategy
8. Implementation strategy - migration, organizational transformation and adoption
9. Benefit realization - documented gains and benefits
10. Cost estimation - documented reference models for cost estimation

Suppliers who are interested in participating in this dialogue process will be invited to an individual meeting in June or August 2019, with submission of documentation subsequent to the meeting.

Note: you are encouraged to answer as extensively as possible but are free to select any subset of subjects or questions that you find applicable. You are also welcome to provide any other reflection or recommendations related to the planning project for this solution concept.

1 FUNCTIONALITY IN THE ELECTRONIC HEALTH RECORD

The feasibility study has shown that the target solution will require a high degree of consolidation of systems to meet the functional needs for the municipalities. This means an overall solution architecture where fewer IT-systems covers the needed functionality for all user groups, more consolidated infrastructure topology and fewer and more standardized integrations. We appreciate your input on how this can be achieved, and your plans to further develop your solution(s) in a five-year perspective to address these issues.

Main areas of interest:

- 1. Functional coverage for health professionals for the services in scope (see table 1 in Appendix 1):** In the assessment of the functional needs, we have used HL7 EHR Functional Model Release 2 to assess functional coverage. To what extent does your solution(s) cover the functionality described in HL7 EHR Functional Model Release 2? What implementations have you delivered where the same solution(s) covers the functional need for all the services in scope?
- 2. Functional coverage for administrative functions:** The assessment of functional needs reveals gaps between the functional need for Norwegian municipal services and the functionality described in HL7 EHR Functional Model Release 2. Some of these areas are:
 - The need to support the Norwegian funding schemes.
 - The need to support procedures regarding deciding on the need for and right to health services. Many of the municipal health services are granted to citizens following a request and a thorough assessment of the individual need of the citizen. The case workers handling these requests are often health personnel with need to integrate the case management process with access to the electronic health record.
 - The need to support procedures regarding assessing and deciding on complaints, appeals and compensations.
 - The need to support the ability to collect adverse events and errors, classify and analyse these and provide feedback to adjust processes and routines and other conditions.
 - The need to manage fleet for home services.

How do you propose to solve the following functional needs?

- 1. Consolidation and integration of systems:** What experiences do you have from consolidating specialized health IT systems, e.g physiotherapy, ECG, dental or spirometry investigation? Based on your experience, how many and which clinical systems in addition to your solution are required to support the needs of the services in scope? How do you manage integrations with these systems in order to provide a uniform user experience?

- 2. Infrastructure topology:** To which extent is it possible to deliver your solution based on cloud computing, alternatively which plans do you have in order to enable this? In your experience, which is the best approach to deliver functionality to users in rural areas with limited network bandwidth?
- 3. Configurability:** How does your solution allow for configuring templates for enterprises, user groups and individual users?
- 4. Documentation practices and usability:** How do you work with improving usability of your solution for health professional (effective documentation, effective information finding, etc)?

2 FUNCTIONALITY IN A CITIZEN PORTAL

Helsenorge.no is the public health website for residents of Norway. The Directorate of eHealth is responsible for the operation and development of the portal, but the content is provided by various parties in the health sector. We acknowledge that many EHR solutions also provide their own citizen portal, and we would like to get your point of view and road map for developing citizen functionality, as well as understand how this functionality can be part of the public website helsenorge.no.

Main areas of interest:

- 1. Functional coverage for citizens:** How does your solution support digital services for citizens? How do you suggest that such services will be further developed and adapted to different citizen and evolving preferences?
- 2. Collaboration between citizens and health professionals:** To which degree does your solution(s) support collaboration between citizens and health professionals? Is this functionality separate from the EHR?
- 3. Interface to other portals for citizens:** Which mechanisms do you provide for accessing the citizen functionality through other 3rd party portals?
- 4. Requests for correction/deletion of patient record information.** How do you propose to implement the patients' right to apply for correction or deletion of their patient record information?

3 COLLABORATION AND INTEROPERABILITY

An important part of the solution concept is to improve overall health sector collaboration. One alternative is to further develop the existing collaboration solutions and/or procure a new collaboration solution. Please refer to Appendix 2 to get an overview of the scope of the collaboration solution.

Main areas of interest:

1. **Overview:** What is the general architecture of your collaboration solution (Health Information Exchange, HIE), and how is it related to the EHR? What are the capabilities of the HIE, and how may it be integrated with other HIE solutions?
2. **Collaboration types:** What types of information exchange does the system support (messaging, data sharing (API), document exchange (IHE-XDS), etc.), and which of them have been implemented in real-life applications?
3. **Need for modification:** In your experience, to what extent must the HIE be modified to work in a specific context?
4. **Clinical information services:** In Appendix 2 we present an overview of a number of clinical information services we anticipate implementing during the course of the project. Please give us your point of view on how we could realize these services using your collaboration solution.

4 IDENTITY AND ACCESS MANAGEMENT, INFORMATION SECURITY AND PRIVACY

Information security and privacy has a high priority. One of the main issues is how to manage identities and access for health personnel to secure timely access to necessary health information, and in parallel securing that only health personnel with privileges accesses the health information.

Main areas of interest:

1. **Identity management:** How do you propose to manage identities; as part of the EHR solution, or in a separate solution? What are the benefits and challenges of your proposed approach?
2. **Access management:** Can you describe your access and authorization engine, specifically any authorization mechanisms you have that address the complex information access needs in the health sector?
3. **Built-in privacy and security:** How are requirements for privacy and information security by design taken care of with regards to the EU privacy regulation (GDPR)?

5 INNOVATION AND ECO SYSTEM SUPPORT

The scope and the expected life span of the planned solution suggests there should be mechanisms to allow for further technology development, continuous development of medical practices and flexibility to manage structural changes in the health sector.

Our aim is to use the new solution as a platform for innovation allowing an eco-system of suppliers to support the development of the primary health care services.

Main areas of interest:

1. **Involvement in your innovation and road map planning:** How do you involve customers and end-users in your innovation and road map planning, during the project implementation and after go-live?
2. **API-management:** How do you suggest that 3rd party applications and micro-services are to be developed and get access to APIs on the solution? What are your plans to develop and manage APIs?
3. **Eco-system support:** How do you support an eco-system of suppliers that develop applications and micro-services interfacing with and leveraging your solution(s)?

6 DECISION SUPPORT, WORK FLOW AND KNOWLEDGE MANAGEMENT

The solution should support the clinical work process, including service coordination and case management, and optimal clinical decisions in particular. The solution should help reduce unwarranted variation in clinical practice, help avoid errors and assist in providing timely, optimal health care for the patient. We acknowledge that this will require higher standardization of processes and medical practices.

Main areas of interest:

1. **Decision and process support:** What functionality do you have for process and decision support? What are the possible input formats for clinical decision support in your solutions? How does your functionality use population data as basis for decision support, in addition to guidelines/published knowledge and the patient's own data?
2. **Knowledge support:** What functionality do you have for knowledge support and knowledge management in your solution?
3. **Clinical work flow:** How does the solution support clinical work flow, i.e. planning, coordinating and performing tasks across health care services? To what extent is this process knowledge-based, and how is it integrated with process and decision support?
4. **Configuring the solution:** What is your suggested best practice with regards to organizing the work with standardizing processes, clinical decision support and knowledge support?

5. **Architecture of decision support:** What is your preferred architecture of providing clinical decision support, e.g external rules engines vs. internal rules engines? How do you support integration with 3rd party rules engines?

Please describe how you foresee the development in these areas over the next five years.

7 CONTRACT AND SOURCING STRATEGY

The procurement strategy will address essential questions concerning the procurement process and contractual regulations needed to ensure deliveries in accordance with the targets for quality, progress and costs. The Norwegian and European regulations on procurement will be an important contextual reference for the strategy. Further, it is common practice for government agencies to base ICT-contracts on (amended versions of) the Norwegian governments standard ICT-contracts (Statens Standardavtaler) where possible.

Main areas of interest:

1. **Structure of procurement, - one or multiple procurements:** To what extent should the scope of the project be divided into more than one procurement, for instance more than one software procurement, separate procurement of operations services and other services etc.?
2. **Delivery model:** What is your preferred delivery model – multi supplier model, single provider, single provider with subcontractor(s) or other?
3. **Location of data processing and storage:** What relevant functionality, if any, is only provided through a software-as-a-service model? To what extent would this lead to patient or employee data being processed or stored outside of Norway, and in what countries?
4. **Contractual incentives:** Which contractual incentives are best suited to counter the effects of customer lock in and to secure lasting vendor/customer cooperation to the benefit of clinicians and patients, and why? Which contractual incentives are least suitable?

We would also be interested in your reflections on the following:

1. **Key success factors:** What are the key success factors with regards to
 - a. the procurement phase
 - b. the configuration and implementation phase
 - c. the management, operation and maintenance phase
2. **Key risks:** What are the key risks with regards to
 - a. the procurement phase
 - b. the configuration and implementation phase
 - c. the management, operation and maintenance phase
3. **Risk mitigation:** How can these risks best be addressed?

8 IMPLEMENTATION STRATEGY

A potential program will involve health professionals in the implementation activities. We will also need to consider the risk associated with the transfer and conversion of data connected to implementation. We would like your views and experience on the typical risks during implementation.

Main areas of interest:

1. **Implementation:** What are key factors for a successful implementation?
 - a. Staffing and organization on both customer and supplier side
 - b. How to share responsibilities between supplier and customer
 - c. Maturation and change activities
 - d. Partitioning and size of implementation project (e.g. geography)
 - e. Activities to reduce risk of extended implementation time
 - f. Key success factors for implementation (experiences)
2. **Migration and conversion:** What strategy and principles do you recommend regarding transferring patient information from replaced solutions? How much of existing patient information is usually converted?

9 BENEFIT REALIZATION

We would like input on documented effects and values, both positive and negative, resulting from the implementation and use of your solution(s).

Main areas of interest:

1. **Process:** Which work processes/areas are affected, and what effects/values has it provided?
 - a. Effects on quality and patient safety (e.g. better treatment outcome, reduction of errors, failures and damages)
 - b. Effects on use of resources and capacity (e.g. health personnel time spend)
 - c. Realignment and change effects in the implementation period
 - d. Increased access to management information/statistics
 - e. User satisfaction
2. **Realization:** When where the effects/values visible (early vs later values) and how durable were they? What factors were important in the realization of the values?

10 COST ESTIMATION

The cost estimates will be further developed and verified in the planning project. We are aware that all cost figures depend on the context and framework conditions in the individual projects, but we would like your experience in terms of the total cost of ownership and the resources needed to achieve a successful implementation of your solution(s). We would like your perspective of the lifetime costs in an operational and management phase.

Main areas of interest:

1. **Pricing model and costs:** Please describe your pricing model, both for the investment and maintenance/operational costs for your solutions (e.g. EHR, HIE, IAM etc).
2. **Price Structure:** In a typical project, how are the cost split between (A) initial investment; (B) development/configuration; (C) infrastructure and hardware; (D) implementation/training?
3. **Payment models:** How you distribute payment over time for your solution(s) in an initiative of this scope?
4. **Migration and conversion:** Based on your experience, what is the typical cost level related to migration and conversion of replaced systems. What is required in advance of clean up and standardization to succeed in a conversion strategy?
5. **Central infrastructure/hardware:** What should we expect in a cost perspective regarding the need for central infrastructure and hardware? How are costs and the pricing model affected by the use of cloud-based solutions?
6. **Staffing:** Based on your experience, what are the staffing requirements from both the supplier and the customer side to succeed with an initiative of this scope?

APPENDIX 1 – BACKGROUND AND OVERVIEW OF THE SOLUTION CONCEPT

The government report «Meld. St. 9 (2012-2013) [Én innbygger – én journal](#)» (One citizen - one record) sets clear goals for the ICT development of the Norwegian health services. The strategy is presently to implement the vision through three strategic initiatives:

1. Implementing the solution "Helseplattformen" in the region of Central Norway
2. On-going EHR up-grade and investment programs in the specialist health care regions of Nord, Vest and Sør-Øst
3. The procurement and implementation of a national electronic health record solution for primary care services outside the region of Central Norway, and a national solution for collaboration and information exchange for all health care services.

The planning project and this dialogue process covers the third initiative. The Directorate of eHealth conducted in 2018 a feasibility study, followed by an external quality audit. The work is conducted in accordance with the government's project model, cf. "*R-108/19 Krav til utredning, planlegging og kvalitetssikring av store investeringsprosjekter i staten*" from the Ministry of Finance.

Further information about the project can be found at our homepage ehelse.no (in Norwegian only)

<https://www.regjeringen.no/no/aktuelt/felles-innsats-for-en-kommunal-pasientjournallosning/id2643533/>

<https://ehelse.no/nyheter/klarsignal-for-videre-arbeid-med-felles-journal-og-samhandlingslosning>

<https://ehelse.no/strategi/n-innbygger-n-journal/nasjonal-journallosning-for-kommunal-helse-og-omsorgstjeneste>

The solution concept consists of a national electronic health record for primary care services outside the region of Central Norway, and a national solution for collaboration and information exchange for all health care services.

All primary and municipal health services are in scope for the target solution. The services are defined as municipal health services in "Lov om kommunale helse- og omsorgstjenester m.m. (helse- og omsorgstjenesteloven), § 3-2, §3-9, §5-5" outside the region of Central Norway are in scope for the target solution. This means that the solution must support all publicly organized health care services that do not belong to state or county authorities, for all patient and user groups, including persons with somatic or mental illness, injury or suffering, substance abuse problems, social problems or impaired functional capacity ("Lov om kommunale helse- og omsorgstjenester m.m. (helse- og omsorgstjenesteloven), § 3-1". Services may, by law, be provided by the municipality itself or by the municipality entering into an agreement with other public or private service providers. The table below distinguishes between 1) statutory municipal health care services, 2) municipal health care services that are not statutory and 3) other health care services associated with the municipality.

Table 1 Primary and municipal health care services

Statutory municipal health care services	Helse- og omsorgstjenesteloven § 3-2
	School health services (skolehelsetjeneste)
	Health clinic services (helsestasjonstjeneste)
	Pregnancy and maternity care service (svangerskaps- og barselomsorgstjeneste)
	Municipal emergency services (legevakt, heldøgns medisinske akuttberedskap og medisinsk nødmeldetjeneste)
	General practitioner services (fastlegetjeneste)
	Social, psychosocial and medical habilitation and rehabilitation (sosial, psykososial og medisinsk habilitering og rehabilitering)
	Home based health services (helsetjenester i hjemmet)
	Personal assistance, including practical assistance and training organized as user-controlled personal assistance and support contact (personlig assistanse, herunder praktisk bistand og opplæring organisert som brukerstyrt personlig assistanse og støttekontakt)
	Institution based health services, including nursing homes and relief measures (Plass i institusjon, herunder sykehjem og avlastningstiltak)
	Helse- og omsorgstjenesteloven § 3-9
	Prison health services (fengselshelsetjeneste)
	Helse- og omsorgstjenesteloven § 5-5
	Municipal doctor (Kommunelege)
	Forvaltningsloven § 1
Allocation office with regards to allocation of municipal health and care services (Tildelingskontor ifm. tildeling av kommunale helse- og omsorgstjenester)	
Municipal health care services that are not statutory	Health centers and other low-threshold services (Frisklivssentraler og andre lavterskeltilbud)
Other health care services associated with the municipality	Private physiotherapy services with operating grants from the municipality (private fysioterapeuttenester med driftstilskudd fra kommune)
	Dental services (Tannhelsetjenesten)

APPENDIX 2 - CLINICAL INFORMATION SERVICES

A major part of the concept is to further develop the collaboration solutions, alternatively procure a new collaboration solution to strengthen the collaboration between the primary health care services and other parties. The following table presents an overview of which parties should be included in the collaboration solution.

Table 2 Parties that will be included in the collaboration solution	
Administrative services in community health care	<ul style="list-style-type: none"> • Accounting and financials • Human relations (HR) and personnel • Logistics including fleet management • Management of adverse events in health care • Payroll management • Purchase and Inventory • Shift management
Community health care including primary care physicians	<ul style="list-style-type: none"> • Community health care organizations using other EHR solutions • Primary care physicians using other EHR solutions
Other services in health care	<ul style="list-style-type: none"> • County Governor/County Chief Medical officer (Fylkesmenn/Fylkeslegen) • Dental health services, private and public • Norwegian Armed Forces Joint Medical Services (Forsvarets Sanitet) • Pharmacies • Response Centers for assistive/welfare technology (Responsssenter for velferdsteknologi)
Regulatory bodies and others	<ul style="list-style-type: none"> • National healthcare registries and SSB • Norsk Helsenett (NHN) • Norwegian Health Economics Administration (HELFO) • Norwegian Institute of Public Health (Folkehelseinstituttet) • Norwegian Medicines Agency (Statens legemiddelverk)
Secondary, tertiary and quaternary health care	<ul style="list-style-type: none"> • Emergency and Acute health care • Hospital services and collaborating specialists (avtalespesialister) • Medical laboratory and radiology services, private and public • Multidisciplinary, specialized drug addiction care • Patient transport and reimbursement (Pasientreiser HF)
Services and actors outside of health care	<ul style="list-style-type: none"> • Child Protective Services (Barnevern) • Court of justice (Domstoler) • Educational-Psychological Service at schools (PPT) • Insurance companies • Norwegian Labour and Welfare Administration (NAV) • School/Preschool

The following table present an overview of some of the clinical information services we anticipate will be supported by the collaboration solution.

Table 3 A selection of information services to be supported by the collaboration solution		
	Information service	Examples
1	Clinical summary	<ul style="list-style-type: none"> • Problem list, list of previous and current diseases, function level (ADL, ICF)
2	Critical information incl. allergies	<ul style="list-style-type: none"> • Allergy to penicillin, implanted pacemaker, haemophilia, complications during anaesthesia
3	Medications	<ul style="list-style-type: none"> • Current medication list, administered medications, planned medication, prescriptions
4	Immunizations and immunity	<ul style="list-style-type: none"> • Previous case of rubella, influenza vaccine taken this month, tetanus vaccine given 2004 (needs boost in 2014)
5	Lab order and results (incl. radiology)	<ul style="list-style-type: none"> • Order for radiology investigation, radiology result report, lab order for hemoglobin, CRP and leucocytes, lab order for microbiology, pathology and genetics, lab result
6	Referral and discharge note	<ul style="list-style-type: none"> • Referral to hospital for suspected cancer, referral to outpatient clinic for assessment of heart failure, discharge note after hospital stay, discharge note after completed health care on specialist outpatient clinic
7	Multimedia, measurements and observations	<ul style="list-style-type: none"> • Radiology images, ECG, video of locomotion, measurements of pulse oximetry, blood pressure, clinical home monitoring
8	Planning	<ul style="list-style-type: none"> • Principal plan for cancer treatment, appointments, planned actions with responsible personnel and status of action.
9	Documents and notes in patient record	<ul style="list-style-type: none"> • Documents and notes from the patient record, e.g. previous discharge notes, progress notes, internal referrals, scanned patient charts
10	Text-based dialog	<ul style="list-style-type: none"> • Dialog between primary care physician and cardiologist, dialog between citizen and primary care physician, dialog between home-care nurse and relative of citizen
11	Video conference	<ul style="list-style-type: none"> • (separate service)
12	Citizen demographics	<ul style="list-style-type: none"> • Information not available in national citizen registry, e.g. temporary address, relatives to be contacted, children in household
13	Reporting to external quality registries	<ul style="list-style-type: none"> • IPLOS/KPR, National Patient Registry (NPR), SYSVAK, MSIS
14	Clinical Knowledge transfer	<ul style="list-style-type: none"> • Knowledge transferred from cardiologist to primary care physician, e.g. how to follow up a patient with ICD, knowledge about care of pressure wound transferred from specialized nurse to home-care nurse.
15	Privacy management	<ul style="list-style-type: none"> • Information about patient reservation for disclosure of clinical information, patient consent to treatment, power of attorney given to relative
16	Health history	<ul style="list-style-type: none"> • Tobacco use, social aspects, health risks, stools, sleep, sexual function, inheritance and genetic disorders in family
17	Observations, measurements and clinical findings	<ul style="list-style-type: none"> • Vital signs, laboratory results, clinical findings like icterus and nystagmus, clinical score results (e.g. MADRS, NEWS), genetic variants

Table 3 A selection of information services to be supported by the collaboration solution

18	Problem list and diagnoses	<ul style="list-style-type: none"> • Current and previous health problems like inherited elevated risk of breast cancer, depression, accidents, diabetes, chronic pain, elevated blood pressure.
19	Procedures, activities and treatments	<ul style="list-style-type: none"> • Surgical and diagnostic procedures, treatment by physiotherapist, patient education, day time service, transport, adaptation of home for improved function
20	Service Request	<ul style="list-style-type: none"> • A request for municipal services, medical aids, financial support, etc.
21	Citizen's information	<ul style="list-style-type: none"> • Preferences for treatment, personal aids (glasses and hearing aids), need for interpretation services, beliefs
22	Index of available services	<ul style="list-style-type: none"> • Investigations and procedures available at various hospitals, health care services available in the municipality

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